STIC Search Report
EIC 2100

STIC Database Tracking Number: 144331

TO: Fred Ehichoya **Location: RND 3B31** **Art Unit : 2162** **Monday, February 07, 2005** **Case Serial Number: 09/782988**	**From: Carol Wong** **Location: EIC 2100** **RND – 4A30** **Phone: 272-3513** **carol.wong@uspto.gov**

Search Notes

Dear Examiner Ehichoya,

Attached are the search results (from commercial databases) for your case.

Color tags mark the patents/articles which appear to be most relevant to the case. Color of tag has no significance. Pls review all documents, since untagged items might also be of interest. If you wish to order the complete text of any document, pls submit request(s) directly to the EIC2100 Reference Staff located in RND-4B28.

Pls call if you have any questions or suggestions for additional terminology, or a different approach to searching the case. Finally, pls complete the attached Search Results Feedback Form, as the EIC/STIC is continually soliciting examiners' opinion of the search service.

Thanks,
Carol

STIC EIC 2100 Search Request Form

144331

Today's Date: 2/7/05

What date would you like to use to limit the search?
Priority Date: 2/13/2001 Other:

Name FRED EHICHIOYA
AU 2162 Examiner # 79719
Room # RAN 3B31 Phone 2-4034
Serial # 09/782,988

Format for Search Results (Circle One):
PAPER DISK EMAIL

Where have you searched so far?
USP DWPI EPO JPO ACM IBM TDB
IEEE INSPEC SPI Other

Is this a "Fast & Focused" Search Request? (Circle One) YES NO
A "Fast & Focused" Search is completed in 2-3 hours (maximum). The search must be on a very specific topic and meet certain criteria. The criteria are posted in EIC2100 and on the EIC2100 NPL Web Page at http://ptoweb/patents/stic/stic-tc2100.htm.

What is the topic, novelty, motivation, utility, or other specific details defining the desired focus of this search? Please include the concepts, synonyms, keywords, acronyms, definitions, strategies, and anything else that helps to describe the topic. Please attach a copy of the abstract, background, brief summary, pertinent claims and any citations of relevant art you have found.

METHOD AND APPARATUS FOR STORING AND MANAGING DATA

Please search claim 1 especially:

"process a search query against the digital data stored on the WORM storge device, and in response to processing the search query against the digital data stored on the WORM storage device generate data that identifies data stored on the WORM storage device that satisfies the search query"

STIC Searcher C. Cuny Phone 272-3513
Date picked up 2-7 Date Completed 2-7-05

Search and Information Resources Administration

U.S. DEPARTMENT OF COMMERCE
Patent and Trademark Office

DOCUMENT RETRIEVAL REQUEST FORM

Requester's Name: Fred Ehichioya	Case Serial Number: 09/782988		Art Unit/Org.: 2162
Phone: 2-	Right Fax #:	Building:	Room Number: RND 3B31
INVENTOR'S NAME:		Date Needed By: RUSH	
Date of Request: 02/07/05			

Paste or add text of citation or bibliography: **Paste Citation** Only one request per form. Original copy only. ☐

Author/Editor:	
Journal/Book Title	
Article Title	
Volume Number:	Report Number: Pages:
Issue Number:	Series Number: Year of Publication:
ISSN:	
Remarks:	***See Attached***

45

527918

Library Action	PTO		LC		NAL		NIH		NLM		NIST		Other	
	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd
Local Attempts	X													
Date	02/07/05													
Initials	SG													
Results	N/A													
Examiner Called														
Page Count														
Money Spent														

		Source	Date
Remarks/Comments 1st and 2nd denotes time taken to a library O/N – Under NLM means Overnight	Ordered From:	BLL ordered & Completed Faxed	
	Comments:		

DIALOG(R)File 2:INSPEC

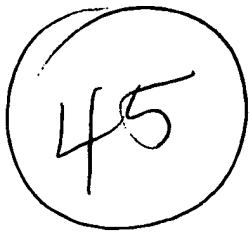
04064418

Title: Optical disk system tracks patient records at major army medical center

Author(s): Newby, W.
Author Affiliation: Brooke Army Med. Center, Fort Sam Houston, TX, USA

Journal: Remittance and Document Processing Today vol.14, no.3 p. 14-15
Publication Date: Sept.-Oct. 1991 Country of Publication: USA
CODEN: RDPTE6 ISSN: 0883-5594
Language: English Document Type: Journal Paper (JP)
Treatment: Practical (P)

Abstract: At Brooke Army Medical Center in Fort Sam Houston, Tex., doctors and researchers spend hours studying records of diseases and treatments that date back to 1947 to treat cancer successfully. While the films may be old, the filing technology is totally modern. Brooke Army



Cancer. It used to mean death. But today, many cancer patients recover from the disease to live active, happy lives. This accomplishment is the result of years of painstaking medical research.

At Brooke Army Medical Center in Fort Sam Houston, Tex., doctors and researchers spend hours studying records of diseases and treatments that date back to 1947 to treat cancer successfully.

data from the file to make retrieval fast and easy.

After indexing, documents can be retrieved in seconds by a multitude of index data fields. Typical index fields include type of disease, location of disease, patient name, age, sex and social security number.

At the tumor registry, for example, researchers or doctors investigating cancer treatments can quickly generate a report of all female patients

OPTICAL DISK SYSTEM TRACKS PATIENT RECORDS AT MAJOR ARMY MEDICAL CENTER

Wanda Newby
Registrar
Brooke Army Medical Center,
Fort Sam Houston, Texas

While the films may be old, the filing technology is totally modern. Brooke Army Medical Center installed an optical disk-based records management system from Kodak to provide archival storage and meet the immediate retrieval needs of several departments.

The medical center consists of a large hospital complex of 26 buildings with teaching and residency programs in every specialty. Brooke handles active duty army members and their dependents and retired personnel with at least 20 years of duty.

The Kodak system allows operators to quickly scan documents and save them on WORM (write once, read many times) optical disks. Operators index specified demographic

under age 40 with breast cancer. Doctors can then examine detailed patient files to study which treatments produced the best survival rates.

The tumor registry contains complete lifelong patient files dating back to 1947. Our medical center has long distinguished itself in the area of cancer research. It established and maintained an uninterrupted accredited cancer program longer than any other medical center in the armed forces.

Each patient chart includes a complete history of the patient. Often that means a volume of 100-150 pages of reports on surgical findings, treatments, and medication.

It's important for doctors to be able to study the progression of a

disease, what other diseases a patient developed later in life and how effective treatments were when combined with lifestyle variables.

Patient files are collected in paper form until a patient dies. Then the files are archived, according to the year of death, on the optical disk records system. Records within each chart are organized in a specific order. Researchers and doctors can electronically page through images on an optical disk, much like they would turn pages of paper.

Brooke Army installed a Kodak KIMS system 4000 in the tumor registry and Pathology Department in 1990. The advantages to the optical disk system are numerous. They include compactness, fast file retrieval, and high quality resolution.

I am currently tracking about one million documents in this department. I have already filled four optical disks, and can hold in my hand records that represent a roomful of file cabinets.

Computerized indexing is a clear advantage to this type of records management. A report of all cases that meet specific indexed characteristics can be generated in minutes, and patient charts are available in seconds.

Reproducing legible copies of tumor and pathology records is a common requirement for our medical center. High-quality document images can be viewed on the system's high-resolution display monitor and printed from a laser printer.

Modern scanning technology actually reproduces an image that is equal, or in many instances superior to the original document, according to First Lieutenant Samuel Wood, who oversees the Pathology Department's system.

Pathology operators scan 300 surgical reports a day, up to 600 pages, into the system. Operators index seven fields of patient and disease information from the documents. The department uses prompts to speed indexing, so the process takes only 60 seconds per document.

At operator's request, reports that list surgical summaries based on topography (location of disease) and morphology (type of disease) can be generated by utilizing the database query language.

Being able to record signatures is of vital concern to both pathology and tumor registry records. These records are accessed to verify com-

puterized patient data and provide additional detail.

Physicians who need to check the results of a patient's previous biopsy or verify a history of disease view pathology records. A doctor will not start any type of cancer therapy without viewing a signed surgical report that verifies the location and type of cancer.

Currently, each department has a standalone workstation. In the future, Pathology plans to network two workstations and install a file server to provide additional file and disk space. That will equip operators to handle much larger work volume.

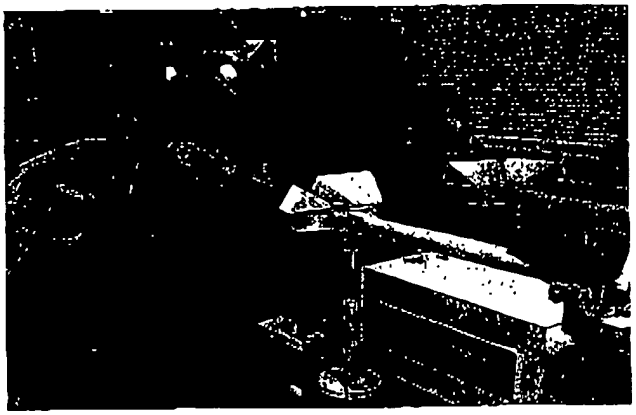
Once networked, both workstations will be able to use the existing laser printer to output documents. Each workstation will have its own scanner to increase the department's input capacity. The Pathology Department has 15 years of records it would like to add to optical disks.

The Pathology Department also handles autopsy reports and pap smears, and First Lt. Wood notes these as possible future applications for the system.

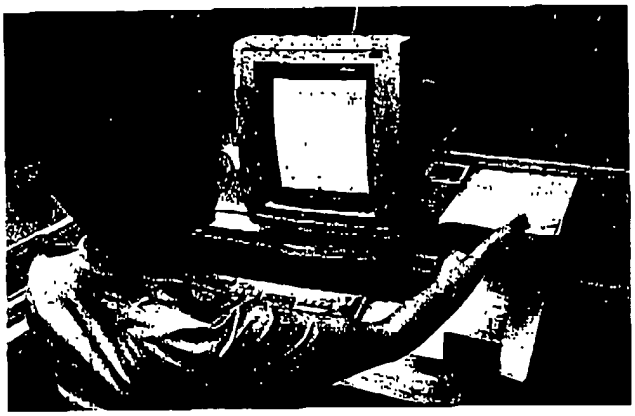
In fact, applications for the system are almost endless. The medical center's blood bank wants to install networked or standalone workstation to handle the 2,000 to 3,000 documents it receives monthly. These documents include blood component cards and blood transfusion data.

The center must be able to accurately track blood from a specific donor to a patient, or from a patient to the donor. Such tracking helps to control diseases transmitted through transfusion, primarily hepatitis and AIDS.

This optical disk records system is a cost-effective way for departments with a small staff and limited space to maintain fingertip access to millions of records.



First Lt. Wood (right) examines new slide presentation with Staff Sergeant Richard Hard (left). The pathology department recently installed a Kodak KIMS system 4000 optical disk records management system to better track surgical reports.



Staff Sergeant Jeanne Duby reviews a surgical record on Brooke Army Medical Center's Kodak KIMS system 4000. The optical disk records management system gives doctors and researchers access to high-resolution document images in seconds.

WANDA NEWBY is a certified Tumor Registrar, who manages the oldest Tumor Registry in the military with a reference date of January 1, 1947, and over 20,000 individual patients with diagnosis of malignancy. She registers approximately 700 new cases annually.

Newby supervises up to seven employees. She trains and evaluates each employee on up to four individual computer systems.

Founding member and designated Test Site of Department of Defense Automated Central Tumor Registry System (ACTUR) which is now mandatory for registries in Army, Navy and Air Force hospitals.

She maintains an approved Cancer Program through the guidelines of the American College of Surgeons Commission on Cancer for Brooke Army Medical Center.

She is a member of Texas Tumor Registrars Association (TxTRA) and National Tumor Registrars Association (NTRA).

Wanda loves to travel and is expecting to assume duties as Research Data Analyst, Department of Oncology, King Faisal Hospital, Riyadh, Saudi Arabia, in the near future.

Kodak and KIMS are trademarks.

CALENDAR

October 13-16, 1991
National Corporate Cash Management Association (NCCMA)
12th Annual Conference
Orlando, Florida

Recognition Technologies Users Assn.
Remittance & Document Processing Forum and Exposition

August 2-5, 1992
Marriott's Orlando World Center
Orlando, Florida

July 11-14, 1993
Marriott's Desert Springs
Palm Springs, California

July 31-August 3, 1994
New Orleans Marriott Hotel
New Orleans, Louisiana

03722908 INSPEC Abstract Number: C90065508

Title: The use of WORM optical disc storage for newspaper cutting in a public library

Author(s): Fulton, A.R.
Author Affiliation: Central Libr., Aberdeen, UK

Journal: Electronic Library vol.8, no.3 p.167-71
Publication Date: June 1990 Country of Publication: UK
CODEN: ELLIDZ ISSN: 0264-0473
Language: English Document Type: Journal Paper (JP)
Treatment: Practical (P)

Abstract: The Local History Department of the Central Library in Aberdeen has a collection of some 2300 volumes of locally produced newspapers and a press cuttings file with 101000 sheets of cuttings. The author describes the optical disc system chosen to help solve the problems of storage and access to this volume of material. The system chosen to help solve the problems of storage and access to this volume of material. The system

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Article

The use of WORM optical disc storage for newspaper cuttings in a public library

Alan R. Fulton

Head of Operations, Libraries, Central Library, Rosemount Viaduct, Aberdeen, Scotland AB9 1GU.

Abstract: *The Local History Department of the Central Library in Aberdeen has a collection of some 2300 volumes of locally produced newspapers, and a press cuttings file with 101 000 sheets of cuttings. The paper describes the optical disc system chosen to help solve the problems of storage and access to this volume of material.*

1. Introduction

The library service in Aberdeen, Scotland, was established about 100 years ago and is now part of the City Arts Department. It provides a comprehensive library service to 213 000 Aberdonians through a network of 17 branches, three mobile libraries and a large Central Library with six public departments. The service lends over 3 million items per year, has 140 staff and a budget of £3.2 million. The lending side of the library service uses a DS Mod 3+ computer-based issue system and the catalogue and ICL in-house book order systems are also fully computerised.

One of the fastest growing areas of the library service is the Local History Department, a branch of the Reference Services Section which also includes the General Reference and the Commercial and Technical Department, all of which are based in the Central Library. Interest in all aspects of local history continues to expand rapidly, particularly interest in genealogy, and the department daily receives letters from all over Britain and indeed the world.

Among the most important resources of the Local History Department is its extensive collection of local newspapers (Table 1). This Newspaper Collection consists of some 2300 volumes of locally-produced newspapers, dating from 1758 to 1963. The earliest volume is the *Aberdeen Journal* of 1758 and apart from some missing issues in the 1760s and 1770s, we have a complete run of the newspaper up to November 1922 when it was amalgamated with the *Free Press* to form the *Press and Journal*. In conjunction with Aberdeen Journals, who publishes the city's two daily newspapers, and Aberdeen University Library we operate a joint microfilming scheme for the local papers. These microfilms are heavily used by enquirers and take the pressure off the fragile backfiles of newspapers which the library houses.

In addition to providing the papers and microfilms, however, the Library Service has been maintaining a press cuttings file for 25 years, with articles and photographs filed in packets under entries that have proved to be the most popular enquiries, such as places, people and companies and subjects (Table 2). The library also maintains various indexes to such vital sections of the newspapers as new local companies and bankruptcies. The file contains some 101 000 sheets of cuttings, many containing four entries, and currently

ABERDEEN CHRONICLE 9 Oct 1806 to 25 Aug 1832
ABERDEEN CONSTITUTION 16 Sept 1837 to 4 Sept 1840
ABERDEEN EVENING GAZETTE 23 Jan 1882 to 31 Dec 1886 2 July 1887 to 30 June 1896 1 Jan 1897 to 30 Nov 1922
ABERDEEN FREE PRESS 6 May 1843 to 30 Nov 1922 (Amalgamated with *Aberdeen Journal* to form the *Press and Journal* q.v.)
ABERDEEN HERALD 1 Sept 1832 to 11 Nov 1876
ABERDEEN JOURNAL 15 Jan 1748 to 30 Nov 1922 (Considerable gaps in sequence prior to 1772. Amalgamated with the *Free Press* to form the *Press and Journal*, q.v. The whole run of *Aberdeen Journal* from 1748 is also available on microfilm at the Central Library)
ABERDEEN OBSERVER 27 Mar 1829 to 11 Mar 1836
ABERDEEN WEEKLY JOURNAL 3 Jan 1877 to 1 Aug 1957
BON-ACCORD AND NORTHERN PICTORIAL 3 Jan 1880 to 12 Aug 1881 20 Mar 1886 to 13 Aug 1914 at Central Library 3 Apr 1926 to 18 June 1959
EVENING EXPRESS 21 Jan 1879 to 29 June 1964 (The file from July 1962 to date is also available on Microfilm at the Central Library)
NORTH OF SCOTLAND GAZETTE 27 Feb 1849 to 29 Apr 1853
PEOPLE'S JOURNAL 8 Jan 1881 to 25 Dec 1915
PRESS AND JOURNAL 1 Dec 1922 to 29 June 1963 (Formed from an amalgamation of the *Aberdeen Journal* and the *Aberdeen Free Press*. The whole run to date is also available on microfilm at the Central Library)
Except where otherwise stated all files are at the Sir John Anderson Branch Library, Woodside. Please telephone 484534 to make an appointment.

Table 1: *Major runs of newspapers held by Aberdeen City Libraries*

The Newscutting Collections consist of approximately 100 910 sheets, made up as follows:-

Local Studies:-

Subject cuttings	:	62900
Biographical	:	25200
		88100

Reference Library:-

Profiles	:	1610
General cuttings	:	1200
Surnames	:	4500
		7310

Commercial Library:-

Abcom File	:	5500

Table 2: *Newscutting collections*

takes up about 18 metres of shelf space — an expensive commodity in a large, refurbished city centre library in the oil capital of Europe. As well as requiring space to store them the cuttings file is time consuming to clip, file and index and increasingly prone to theft by light-fingered historians.

2. Optical disc storage

A few years ago, when the space allocated to the cuttings collection was approaching capacity and no more convenient storage space could be found, it was decided to consider high-tech solutions to this storage problem. Various systems of microfilming and indexing were examined, as was the use of optical disc storage. To our surprise, we discovered that this was in fact likely to be the cheapest solution, certainly as regards set-up costs, as well as the cheapest and easiest system to maintain and use. We already had a sum of £25 000 in our capital budget for microfilming equipment and by one of those lucky chances which happen all too seldom in local government we were allocated this sum as a result of some last minute changes in capital allocation calculation.

Delighted though we were to get the money, we only had five or six weeks in which to select, buy, pay for and get operational one of the systems we had looked at in only a very cursory manner. Fortunately when we started looking in earnest we discovered that there were only four or five companies offering packages which were suitable and within our budget. After a couple of weeks of phoning, faxing and praying we opted for a CACL system using Compaq PCs, and bundled by Computerland. The main attraction of the system, which we had to buy sight unseen, was the fact that we could buy two complete systems for our £25 000 — as opposed to the single Kodak system the same money would buy.

The system consisted of a Microtek MSF-300C Image Scanner — a high resolution (300 x 300 dots per inch) optical page scanner which converts text, photographs etc. into binary code for processing by a Compaq Deskpro 286 Computer with a 40 Mb hard disk and 1.2 Mb diskette drive, and storing via an Intelligent Archive Optical Disc Drive on double-sided discs with a capacity of 120 Mb per side. A Hewlett Packard Laser Jet 11 provides print facilities. The system uses CATALYST Graphic Handling Software to scan, save, read and print and THE CORPORATE RETRIEVER free-text retrieval software to index and retrieve the images.

```
Command : FTOURISM
Search      3;          2 references in        2 documents
Approximately 100% documents searched.
Command : L
Search      3;          2 references in        2 documents
1   D:\SEP8859.TXT      (1 ref)
                        PJ 6 SEPTEMBER 1988 P10 UPPER DONSIDE TOURISM
                        PROMOTION BY UPPER DONSIDE
2   D:\AUG8837.TXT      (1 ref)
                        PJ 13 AUGUST 1988 P3 GRAMPIAN REGION TOURISM REVEN
                        JOBS REPORT IN QUARTERLY
Command : B
Maximum search TIME
D:\SEP8859.TXT          PJ 6 SEPTEMBER 1988 P10 UPPER DONSIDE TOURISM
                        PROMOTION BY UPPER DONSIDE
..FRAME "D:SEP8859.IMG"
PJ 6 SEPTEMBER 1988 P10 UPPER DONSIDE TOURISM PROMOTION BY UPPER DONSIDE
ENTERPRISES TOUR BY ALAN DEVEREAUX SCOTTISH TOURIST BOARD CANDACRAIG
GARDENS OWNER HARRY YOUNG LOGO DESIGNED BY HELEN DENERLY SCULPTRESS
DESKRYSHEIL PROJECTING LONACH GAMES
back, next, up, down, top, keep, quit or end:
```

Figure 1: *Free index terms*

```
Command : F  OIL
Search        4;        72 references in      72 documents
Approximately           100% documents searched.
Command : F  OIL EXCEPT PIPER
Search        5;        26 references in      26 documents
Approximately           100% documents searched.
Command : L
Search        5;        26 references in      26 documents
1 D:\AUG88173.TXT (1 ref)
                        PJ 23 AUGUST 1988 P12B JEBSON DRILLING OIL COMPANY
                        EXPANSION CONTRACTION AT
2 D:\AUG172.TXT (1 ref)
                        PJ 23 AUGUST 1988 P12A JEBSENS DRILLING OIL COMPAN
                        150 MILLION RECOVERY PACKAGE
3 D:\SEP8861.TXT (1 ref)
                        PJ 6 SEPTEMBER 1988 P5 TWANG TRAMP LIVED IN HUT ON
                        COUNTESSWELLS ROAD OIL
4 D:\AUG88149.TXT (1 ref)
                        PJ 17 AUGUST 1988 P14 L V "BUD" McGUIRE PROMOTED
                        VICE-PRESIDENT OPERATIONS FOR
```

Figure 2: *Use of operators*

The equipment was quickly delivered and installed and was operational within a few weeks. Although training was limited, staff quickly adapted to the equipment and started using it. We then discovered our first problem, namely that as we were storing newsprint, a fuzzy medium with considerable print-through, our monitors were simply not high definition enough for us to read small print on screen, vital if we were to avoid slow and costly printing of large numbers of pages. New high resolution Wyse 7000 monitors were supplied and we happily developed the system until we hit our second major problem — due to a software fault we could write only to a small percentage of each disc's capacity. Again this problem was solved very simply and the equipment has now been working efficiently for several months.

3. How the system is used

The newspaper articles are scanned with the scanner settings manipulated to give optimum quality and the image is indexed. There are no restrictions as to which case is used as articles can be retrieved regardless of whether upper or lower case has been used. The order of index terms is immaterial — this is useful as more than one indexer uses the system, and this allows for indexing idiosyncrasies.

A large number of free index terms can be used (up to a limit of 270 bytes) as can be seen in the bottom few lines in fig.1.

Once scanned and indexed the document is then saved to the Optical Disc Drive, in our case labelled with a simple formula — month, year and running number, e.g. SEP 8859 in fig.1.

The Corporate Retriever software gives considerable flexibility of access. When the Retriever is asked to FIND (F) a particular subject, it gives the number of entries on file. At this stage it can be simply asked to LIST (L) all entries; however, it can only list abbreviated entries. To check full length index entries the command BROWSE (B) must be used. Fig. 1 shows use of all three commands.

The Retriever also allows selective accessing. For example if the FIND command produces a large number of entries the field of enquiry can be narrowed by using OPERATORS such as AND, EXCEPT, WITHIN etc. (Fig.2). Similarly the search can be widened to include related subjects using the OR operator. The Retriever also permits truncation, i.e. it allows access to documents where varying indexing terms have been used. For example INDUST?* will retrieve INDUSTRY INDUSTRIALISATION INDUSTRIES INDUSTRIAL etc.

Retrieval to screen takes about 30 seconds and the image can be manipulated, rotated, zoomed, inversed etc.

If hard copy is required then the user can ask for a print of the image on screen, the printing out taking about two minutes (Fig. 3).

The quality of printout is superior to that obtained from microfilm and at least equal to copies made from the original by photocopy machine.

Each disc holds approximately 2400 files (i.e. 1200 cuttings). The size of the cuttings varies from around 60 000 bytes for a small article without a photograph to almost 300 000 bytes for a large one with photographs. An average size would be approximately 105 000 bytes per cutting.

The time to input one cutting varies between two and four minutes depending on the size and scanner adjustments required.

The system is clean (i.e. no need to mess about with glue and bits of paper), space saving and very flexible with regards to indexing and printed output; quality, expecially of

photographs, is superb. Running costs, while more expensive than the old system's needs of brown card, glue and scissors are proving to be acceptable. We need only four double sided discs (each with a 240 Mb capacity) per year at a cost of around £600 and falling.

The system is quick to use in terms of both response time and time taken to load, and is also theftproof. Backup and support has been prompt and of course the PCs can run a range of other software programmes, allowing us to bring wordprocessing, spreadsheets, desktop publishing etc. into the Department at no extra cost.

4. Intelligent Character Recognition (ICR)

It was mentioned earlier that we originally bought two sets of equipment. We were not satisfied with two identical image systems and so decided to start inputting text as well as images. For a further £5000 we acquired a Kurtzweil 35 scanner, which with its sophisticated intelligent character recognition (ICR) software is packagod by CACL under the name Catchall. This system allows us to switch between the image storage described above and text mode. It uses the ICR software to read and automatically index texts. The scanner 'learns' the font used then reads the text.

It transfers the scanned material into the wordprocessing package (WordPerfect 5.1) for tidying up, and then automatically indexes every word and finally writes it to disc. When retrieval mode is selected the stored text can be interrogated and the system will list all references to a given word; each document listed can then be browsed and printed out. This system is still being bedded-in but is already proving very useful for text storage. The capabilities of the ICR software are demonstrated in fig. 4 which has not been through the wordprocessing retouching stage. The figure also shows what happens when you forget to change the column setting!

The Kurtzweil scanner is extremely flexible and can be used on its own to handle text and image material. It is a relation of the Kurtzweil Reading Machine for the Blind, and as we have recently also bought this equipment we are hopeful of linking its DecTalk speech synthesizer software to our optical disc system as well.

D:\AUG88200.TXT PJ 12 AUGUST 1988 P3B BALLATER HIGHLAND GAMES MONALTRIE PARK RESULTS PHOTO
..FRAME "D:AUG88200.IMG"
PJ 12 AUGUST 1988 P3B BALLATER HIGHLAND GAMES MONALTRIE PARK RESULTS PHOTO

QUEEN'S Own Highlanders L-Cpl. Donald McIntyre from South Uist sweats in the sun as he tak in the solo piping competition at Ballater Highland Games.

Figure 3: *Printed screen image*

This system has been used to store, index and retrieve information on all aspects of Compulsory Competitive Tendering as it affects local government. Office administration, Council minutes and desktop publishing are other areas that we intend to investigate with the system. We are also talking to CACL about networking, jukeboxing and linking to CD-ROM; however these developments are unlikely to come to pass quickly.

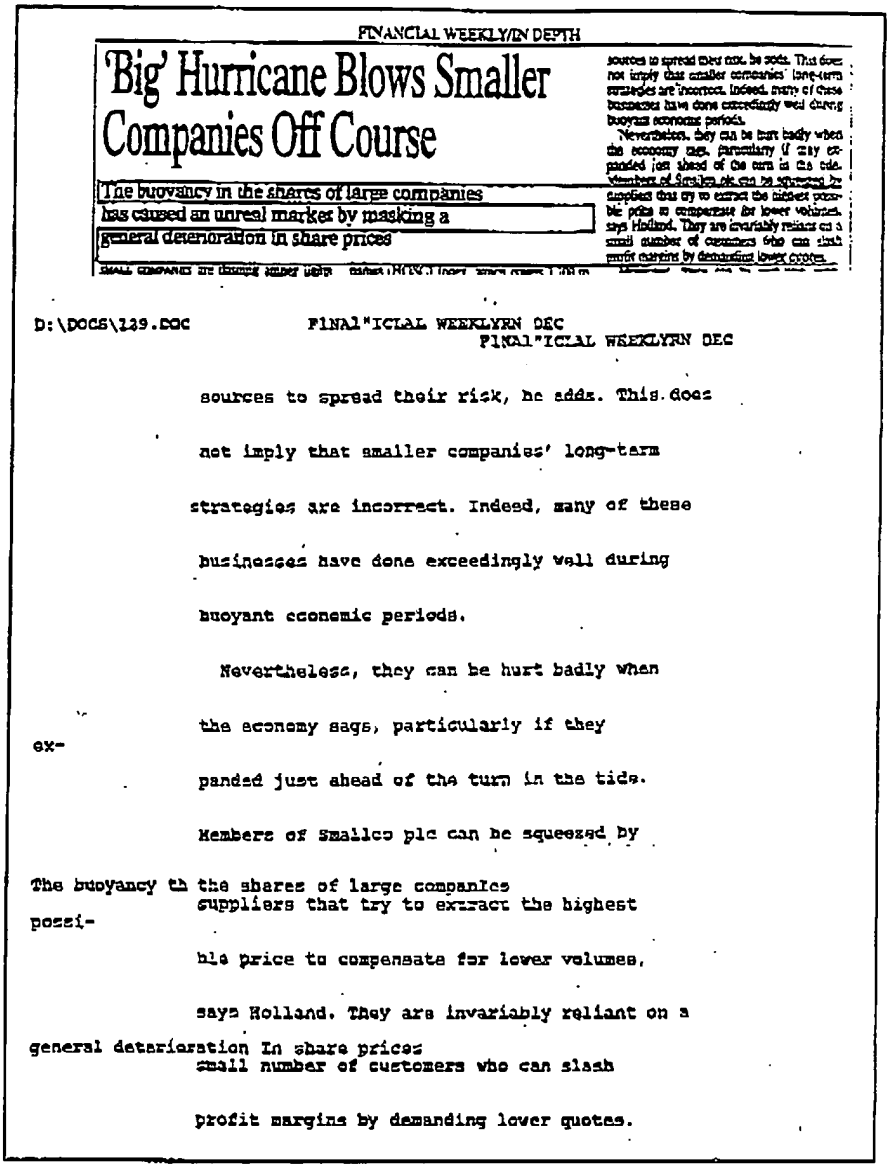
Our equipment is of course ageing rapidly in the fast moving world of computer technology and at least one library computer company is now offering an image storage system which uses a video camera to scan images in full colour. Obviously such a system has considerable advantages for colleagues working in art galleries, who are hampered by the relatively small size of fixed scanners. However these systems are very expensive.

5. Conclusion

To our knowledge, the Aberdeen library is the only public library using an optical disc system. We are certain that it has a role to play in public libraries. It is important to note that public libraries often identify the potential of new technology very early on. However,

they simply do not have the money to buy and develop the equipment until its price has fallen as the result of the general expansion of the use of the relevant technology in other richer areas of trade and industry. There are exceptions of course. For example, library circulation systems were for years far ahead of the EPOS (electronic point of sale) systems the retail sector was using. Recently, however, this sector has moved forward quickly and our systems are now beginning to look slow and restricted, especially with regard to the management information they generate for us.

With the new optical disc system, however, our library, for a few months at least, was able to cast aside its spectacles and replace them with the designer shades of the world of high technology. Running costs are around £650 per year for four double-sided optical discs and, although this is more expensive than the old paper clippings system, it is nevertheless acceptable in view of the advantages obtained. Finally you may like to know that a dealer recently phoned us and offered us a 350 Mb rewriteable disc for only £2000. We're seriously thinking about getting it!



FINANCIAL WEEKLY/IN DEPTH

'Big' Hurricane Blows Smaller Companies Off Course

The buoyancy in the shares of large companies has caused an unreal market by masking a general deterioration in share prices

D:\DOCS\139.DOC FINAL*ICIAL WEEKLYRN DEC

sources to spread their risk, he adds. This does not imply that smaller companies' long-term strategies are incorrect. Indeed, many of these businesses have done exceedingly well during buoyant economic periods.

Nevertheless, they can be hurt badly when the economy sags, particularly if they ex-

panded just ahead of the turn in the tide.

Members of Smallco plc can be squeezed by

The buoyancy th the shares of large companies

suppliers that try to extract the highest possi-

ble price to compensate for lower volumes,

says Holland. They are invariably reliant on a

general deterioration in share prices

small number of customers who can slash

profit margins by demanding lower quotes.

Figure 4: *Use of ICR software*

The author

Alan Fulton

Alan Fulton has worked in public libraries for 20 years and is currently Head of Operations — Libraries with Aberdeen City Arts Department. He has been involved in the development of a wide range of computer based systems for library purposes.

```
File 696:DIALOG Telecom. Newsletters 1995-2005/Feb 04
         (c) 2005 The Dialog Corp.
File  15:ABI/Inform(R) 1971-2005/Feb 07
         (c) 2005 ProQuest Info&Learning
File  98:General Sci Abs/Full-Text 1984-2004/Sep
         (c) 2004 The HW Wilson Co.
File 112:UBM Industry News 1998-2004/Jan 27
         (c) 2004 United Business Media
File 141:Readers Guide 1983-2004/Sep
         (c) 2004 The HW Wilson Co
File 484:Periodical Abs Plustext 1986-2005/Jan W5
         (c) 2005 ProQuest
File 608:KR/T Bus.News. 1992-2005/Feb 07
         (c)2005 Knight Ridder/Tribune Bus News
File 813:PR Newswire 1987-1999/Apr 30
         (c) 1999 PR Newswire Association Inc
File 613:PR Newswire 1999-2005/Feb 07
         (c) 2005 PR Newswire Association Inc
File 635:Business Dateline(R) 1985-2005/Feb 05
         (c) 2005 ProQuest Info&Learning
File 810:Business Wire 1986-1999/Feb 28
         (c) 1999 Business Wire
File 610:Business Wire 1999-2005/Feb 07
         (c) 2005 Business Wire.
File 369:New Scientist 1994-2005/Jan W4
         (c) 2005 Reed Business Information Ltd.
File 370:Science 1996-1999/Jul W3
         (c) 1999 AAAS
File  20:Dialog Global Reporter 1997-2005/Feb 07
         (c) 2005 The Dialog Corp.
File 624:McGraw-Hill Publications 1985-2005/Feb 07
         (c) 2005 McGraw-Hill Co. Inc
File 634:San Jose Mercury  Jun 1985-2005/Feb 05
         (c) 2005 San Jose Mercury News
File 647:CMP  Computer Fulltext 1988-2005/Jan W3
         (c) 2005 CMP Media, LLC
File 674:Computer News Fulltext 1989-2005/Jan W5
         (c) 2005 IDG Communications

Set     Items   Description
S1      76008   WORM OR WORMS OR WRITE()ONCE(1W)READ()MANY
S2       1192   S1(5N)(MEMORY? OR MEMORIES OR STORAGE?)
S3        435   S1(5N)(STORE OR STORES OR STORED OR STORING)
S4       1271   S1(5N)(ARCHIV? OR PRESTOR? OR WAREHOUS? OR HOUS??? ? OR CA-
            PTUR? OR RETAIN? OR COLLECT? OR PRESERV? OR ACCUMULAT? OR CUM-
            ULAT? OR AMASS?)
S5        455   S1(5N)(DEPOSIT? OR REPOSIT? OR SAVED OR SAVE? ? OR SAVING -
            OR DATABASE? OR DATASET? OR DATABANK? OR DATASTOR? OR DATAFIL-
            E? OR DATASYSTEM?)
S6          0   S1(5N)(DATACOLLECT? OR DATALIBRAR? OR DATAMART? OR STOREHO-
            US?)
S7         43   S1(5N)DATA()(BASE? ? OR SET? ? OR BANK? ? OR FILE? ? OR SY-
            STEM? ? OR LIBRAR? OR MART? ?)
S8    3445721   QUERY? OR QUERIE? ? OR SEARCH? OR SUBQUER? OR SUBSEARCH? OR
             RETRIEV? OR TEXTSEARCH? OR DATAMIN? OR IR OR HARVEST?
S9    2965864   INQUIR? OR ENQUIR? OR FETCH? OR INTERROGAT? OR REQUISITION?
             OR EXTRACT?
S10   1112112   MINE OR MINES OR MINED OR MINING
S11   1679346   INDEX? OR INDICIE? ? OR INDICE? ? OR SUBINDEX? OR SUBINDIC-
            E? OR SUBINDICIE? ?
```

S12 887309 METAVALUE? OR METADATA? OR METATAG? ? OR TAG OR TAGS OR DESCRIPT?R? ? OR IDENTIFIER? OR CLASSIFY? OR CLASSIFIE? OR CLASSIFIC? OR TAXONOMY?
S13 52194 TAXONOMIE? OR TOPICTREE? OR META()(VALUE? ? OR DATA)
S14 1372506 KEYFIELD? OR KEYDATA OR KEYWORD? OR KEYPHRASE? OR KEYTEXT? OR KEYTERM? OR KEYATTRIBUT? OR KEYPARAMET? OR KEYCRITER? OR KEYCONCEPT? OR KEYTOPIC?
S15 105986 KEY()(FIELD? ? OR DATA OR WORD???? ? OR PHRASE? OR TEXT? ? OR TERM? ? OR TERMINOLOG? OR ATTRIBUTE? OR PARAMETER? OR CRITERIA? OR CRITERION?)
S16 24068 KEY()(CONCEPT? ? OR TOPIC? ? OR SUBJECT? ? OR THEME? ?) OR KEYSUBJECT? OR KEYTHEME?
S17 0 CDWORM?
S18 341 S2:S7(S)S8:S10
S19 42 S18(S)S11
S20 15 S18(S)S12:S16
S21 516 S1(S)S11
S22 34 S21(S)S12:S16
S23 77 S19:S20 OR S22
S24 25 S23/2002:2005
S25 52 S23 NOT S24
S26 44 RD (unique items)

26/3,K/8 (Item 7 from file: 15)
DIALOG(R)File 15:ABI/Inform(R)

01134958 97-84352
Consulting services buoy resellers
Grace, Tim
Computer Reseller News Benchmarks Supplement PP: 33-34 Dec 4, 1995
ISSN: 0893-8377 JRNL CODE: CRN
WORD COUNT: 1252

...TEXT: completed.

"The biggest mistake our clients make is in thinking that by installing a new **storage** medium like CD- **WORM** all they need to do is scan files and store them," DiCioccio said. "We have to make them recognize that they need an **index** scheme that will enable them to easily **retrieve** information."

Once questions of storage methodology are answered, IPRO sells ongoing support that ranges from...

26/3,K/9 (Item 8 from file: 15)
DIALOG(R)File 15:ABI/Inform(R)

01125815 97-75209
Litigation support - The status quo takes the stand
Hadzi-Pavlovic, Natasha
Inform v9n10 PP: 34-35 Nov/Dec 1995
ISSN: 0892-3876 JRNL CODE: IFN

...ABSTRACT: System, manufactured by Decision Management Co. Inc. Documents are scanned into the system and then **indexed** via drop-down lists into bibliographic fields of a Microsoft Access database. The files are then optically recognized, full-text **indexes** are entered into the Questys database, and image and text files are **stored** on **WORM** optical

disks. The documents are also burned onto CD-ROM discs and distributed, along with Questys **retrieval** software, to the participating law firms. With its extremely fast **search** algorithm, Questys delivers precise answers to information requests in seconds - and any single request takes ...

26/3,K/12 (Item 11 from file: 15)
DIALOG(R)File 15:ABI/Inform(R)

00937318 95-86710
Setting up a paperless office
Hunton, James E
Journal of Accountancy v178n5 PP: 77-85 Nov 1994
ISSN: 0021-8448 JRNL CODE: JAC
WORD COUNT: 1500

...TEXT: far more data. However, when speed is a priority, the hard drive is used. The **index** database, for example--from which all **retrievals** are triggered and for which speed is a priority--usually is kept on a hard...

...The company reserves a fast computer with a high-capacity hard drive to accommodate the **index** , which already takes up 400 megabytes (Mb) of disk space and continues to grow. The optical **storage** devices are **write - once - read - many** (WORM) optical disk drives, each with 940-Mb capacity. They are operated by a "jukebox," a device that stores, **retrieves** and "plays" disks much like a regular jukebox. It can handle as many as 50...

26/3,K/13 (Item 12 from file: 15)
DIALOG(R)File 15:ABI/Inform(R)

00915148 95-64540
Small brokerage helped by electronic imaging, printing
Hoffman, Thomas
Computerworld v28n37 PP: 47 Sep 12, 1994
ISSN: 0010-4841 JRNL CODE: COW
WORD COUNT: 505

...TEXT: 200 image-enabled IBM ValuePoint PCs using MicroBank Software, Inc.'s System for Transaction Optical **Retrieval Query** Manager, a Windows-based package that **indexes** and **retrieves** data from **write - once read - many** technologies where customer statements are **stored** .

The files are routed from the IBM ValuePoints over an IBM Token Ring LAN network...

26/3,K/15 (Item 14 from file: 15)
DIALOG(R)File 15:ABI/Inform(R)

00756262 94-05654
Lab news
Anonymous
Computers in Healthcare v14n10 PP: 51-53 Sep 1993
ISSN: 0745-1075 JRNL CODE: CIH
WORD COUNT: 1653

...TEXT: up to 20 times higher than magnetic storage, allows random access, and uses non-erasable **write - once , read - many** technology for security.

Archive Plus interfaces with any hospital system and provides full automation, auto **indexing** , global **search** , document browsing and online access during host down time, said MedPlus officials. MedPlus, CLMA Booths ...

26/3,K/16 (Item 15 from file: 15)
DIALOG(R)File 15:ABI/Inform(R)

00726241 93-75462
Integrated CD-ROM and WORM Optical Disk Systems on the Navy's Paperless Ship
Thiel, Thomas J.
CD-ROM Professional v5n3 PP: 17-26 May 1992
ISSN: 1049-0833 JRNL CODE: LDP
WORD COUNT: 4362

...TEXT: drive; hence, they usually do not compete with CD-ROM for information dissemination.

The complete **WORM** document **storage** and **retrieval** system normally consists of a scanner to convert the image from paper to an electronic image, a laser printer, one or more **WORM** disks for **storage** , software for **indexing** and **retrieval** and, of course, a computer to manage the entire process. An example of a PC...personnel performed the document scanning and indexing and stored the scanned images on the TOPS **WORM** optical disks.

Since the system **captures** paper-based information in raster bitmapped form, an **indexing** and **retrieval** database was required. This database, which was customized for each ship, contains descriptive information about each document (a surrogate of the document). It is this database that is **searched** to locate and **retrieve** a scanned document from optical disk. The **indexing** and **retrieval** database was developed with the LaserData LaserFile software.

Forms-fill-in functionality was also included...

26/3,K/18 (Item 17 from file: 15)
DIALOG(R)File 15:ABI/Inform(R)

00597156 92-12329
Phoenix, a Pioneer in Imaging, Wins Acclaim and Saves Millions
Anonymous
Modern Office Technology v37n2 PP: 33, 36 Feb 1992
ISSN: 0746-3839 JRNL CODE: MOP
WORD COUNT: 1203

ABSTRACT: Phoenix, Arizona, was the first municipality to use optical-based imaging technology to store and **retrieve** official records. The award-winning system, which began operations in April 1990, was designed by Wang Laboratories. The new imaging system employs a PACE database, which

is created when **indexing** documents by name, subject, location, date, document type, document number, and several other criteria. Documents...

...average rate of 600 to 800 a day. The Phoenix system uses 12-inch WORM (**Write Once , Read Many**) optical disks, each capable of **storing** 40,000 documents. The system's jukebox houses 89 such disks, capable of storing 3...

...Department received over 38,000 requests for information and copies of records. Images are now **retrieved** in 30 seconds instead of the former 5 minutes. The imaging system is only one...

26/3,K/19 (Item 18 from file: 15)
DIALOG(R)File 15:ABI/Inform(R)

00578259 91-52606
Storing Data on Optical Disk Drives
Anonymous
Bank Systems & Technology v28n10 PP: 64, 66 Oct 1991
ISSN: 1045-9472 JRNL CODE: BSE
WORD COUNT: 1597

...TEXT: s Stor/Trans and Stor/Fiche turnkey systems can be used in microcomputer systems to **retrieve** transaction records and report records from (**WORM**) drives. The software handles data **archiving** through downloading, converting and **indexing** , compression and file copying functions. Once the data has been stored on an optical drive, users can **retrieve** the data and share it via operating systems such as Novell Inc.'s NetWare, IBM Corp.'s OS/2 or Digital Equipment Corp.'s Pathworks. Stor/Trans **indexes** raw transactional data using variable **search** criteria. Stor/Fiche takes the same micrographic report output produced for fiche servicing and converts...

26/3,K/20 (Item 19 from file: 15)
DIALOG(R)File 15:ABI/Inform(R)

00565016 91-39370
Litigation Support Automation: Imaging Applications and Markets
Schantz, Herbert F.
IMC Journal v27n4 PP: 21-25 Jul/Aug 1991
ISSN: 0019-0012 JRNL CODE: IMC

...ABSTRACT: documents of a case can be scanned and then cross-referenced to a litigation-support **database** . Nonerasable **WORM** optical disks employed on optical scanning systems have emerged as the optimum solution for the scanning, **indexing** , storage, and **retrieval** of documents vital to litigation support. The progressive law firms that have committed to these...

...Legal professionals are discovering that write-once optical disks are ideal for the storage and **retrieval** of pictures, images, signatures, and other nontext material vital to a case. ...

26/3,K/22 (Item 21 from file: 15)
DIALOG(R)File 15:ABI/Inform(R)

00534983 91-09327
Arizona County Recorder's Office Converts to Optical Disk Records Management System
Anonymous
IMC Journal v27n1 PP: 17-19 Jan/Feb 1991
ISSN: 0019-0012 JRNL CODE: IMC

...ABSTRACT: of 2 workstations, a document scanner, a laser printer, and two 5 1/4-inch **WORM** (**write once** , **read many**) optical disk drives. Downloading of voter registration data from Pinal County's IBM 4381 mainframe computer reduces manual **indexing** of the image **descriptors** , which speeds up the conversion process. Funding for the optical disk system was obtained in...

26/3,K/23 (Item 22 from file: 15)
DIALOG(R)File 15:ABI/Inform(R)

00522036 90-47793
State Department Looks to the STARS
Anthes, Gary H.
Computerworld v24n44 PP: 37 Oct 29, 1990
ISSN: 0010-4841 JRNL CODE: COW

ABSTRACT: To **index** , track, and **retrieve** congressional correspondence, foreign policy memoranda, letters, and other important documents going to and from the secretary of state and deputies, the US State Department uses the Secretariat Tracking and **Retrieval** System (STARS). The system resides on a Wang Laboratories Inc. VS 10000 Model 100 machine...

...Department scans 35,000 documents annually, averaging 5 pages each, into STARS. Documents are scanned, **indexed** , and stored on online magnetic disks for about 4 weeks. They are then moved to **write - once** , **read - many** (**WORM**) optical disks **stored** in an optical disk jukebox that can hold 176G bytes of data.

26/3,K/25 (Item 24 from file: 15)
DIALOG(R)File 15:ABI/Inform(R)

00386341 88-03174
Optical Disks in the Office
Canning, Bonnie
IMC Journal v23n5 PP: 9-10 Sep/Oct 1987
ISSN: 0019-0012 JRNL CODE: IMC

...ABSTRACT: to digitized images, a central processing unit (CPU), a high-resolution monitor, a laser printer, **indexing** and **retrieving** software, and disks and drive. **WORM** systems **store** both digital data, created by word processing, spreadsheet, or graphics systems, and digital images, input...

...per disk is 400,000 digitally produced pages or 60,000 scanned pages. Data are **retrieved** and displayed quickly, and communication and network options make sharing of data possible. Once entered...

...expense, 2. design volatility, 3. lack of standardization, 4. untested archival capabilities, 5. variations in **indexing** and **retrieval** software, and 6. inability to change incorrect data.
? t26/3,k/26,33-35,37-38,42-44

26/3,K/26 (Item 25 from file: 15)
DIALOG(R)File 15:ABI/Inform(R)

00367963 87-26797
The Integration and Use of Write-Once Optical Information Systems
Grigsby, Mason
IMC Journal v23n4 PP: 9-13 Jul/Aug 1987
ISSN: 0019-0012 JRNL CODE: IMC

...ABSTRACT: use and implementation. The write once, read many (WORM) disk is appropriate for office document **retrieval** systems. The advantages of digital document storage and **retrieval** are: 1. remote access and transmission, 2. access speed, and 3. simultaneous access, linking, sequencing, and display of documents, data, and text. Optical disk systems capture, store, and **retrieve** externally generated paper. Most systems will require digitizer scanners rather than optical character recognition scanners, and **key word** , rather than full text, **search** software. A major advantage of WORM is the inability to change documents, thus **preserving** their integrity. Applications for **WORM** disk systems include: 1. paper document replacement, 2. digital data storage, and 3. replacement of...

26/3,K/33 (Item 1 from file: 813)
DIALOG(R)File 813:PR Newswire

0988584 DCTU011
TO BUSINESS AND TECHNOLOGY EDITORS:

DATE: August 27, 1996 10:41 EDT WORD COUNT: 760

...protect that investment."

About TREEV/Plus

TREEV/Plus is a client/server document storage and **retrieval** application that provides fast access and **retrieval** to mission-critical reports and data. TREEV/Plus gathers, **indexes** , compresses and **stores** report data on **Write - Once** , **Read - Many** (WORM) optical cartridges. It effectively replaces the use of paper, microfilm and microfiche as a...

26/3,K/34 (Item 2 from file: 813)
DIALOG(R)File 813:PR Newswire

0955275 DCW020
NETWORK IMAGING WINS AT THE BUREAU OF PUBLIC DEBT; RAID-ENHANCED COLD SYSTEM PUTS ESSENTIAL RECORDS ON-LINE, PROVIDING DRAMATIC BENEFITS

DATE: May 29, 1996 11:54 EDT WORD COUNT: 665

...Public Debt identified 1View:COLD/ES as the most promising solution. Users now request and **retrieve** , in a matter of seconds, the bond records which are **indexed** by the date of issue and the bond serial number. It is no longer necessary to load and unload hundreds of tape cartridges each day to **retrieve** vital business information. Recording bond transactions directly onto **WORM** (**write once** , **read many**) optical **storage** also eliminates the need to create additional archival of microfilm, resulting in dramatic reductions in...

26/3,K/35 (Item 3 from file: 813)
DIALOG(R)File 813:PR Newswire

0366132 NY043
EDS TO DO OPTICAL STORAGE OF INFORMATION FOR THE ARMY

DATE: April 30, 1991 10:59 EDT WORD COUNT: 373

...scanners digitizing the information so they can be handled electronically. The records then will be **indexed** so they can be accessed and **retrieved** . They will be permanently **stored** on " **write - once - read - many** " laser optical disks.

Retrieval of the records will occur on workstations that feature on-line...

26/3,K/37 (Item 1 from file: 635)
DIALOG(R)File 635:Business Dateline(R)

0723346 96-81845
Corporate profile for Optical Technology Group Inc.
Sowards, Sophia
Business Wire (San Francisco, CA, US) p1
PUBL DATE: 960726
WORD COUNT: 502
DATELINE: Bethesda, MD, US, South Atlantic

TEXT:

...a flexible, efficient, mass storage solution that provides an intelligent file server interface to mass **storage** devices. DiskExtender manages **WORM** and read/write optical, tape, CD-ROM, and jukebox subsystems, transparent to the user.

CDExtender...

...visually connect to a CD-ROM or erasable optical jukebox, mount the selected media, and **retrieve** data. JukeMeister is OTG's entry level CD-ROM and erasable optical storage management solution...
...Any object (e.g., images, word processing files, spreadsheets, sound, video, etc.) can be stored, **retrieved** , mailed, printed, and faxed.

ColdExtender(TM)
   ColdExtender gives users the ability to **extract** , store, and **retrieve** ASCII computer reports. This process allows volumes of data to be stored on optical disk...

...electronically pre-
master COLD reports and image applications for publication to CD-ROM including all **indices** , databases, and viewer software. The finished CD contains everything necessary to sort, **retrieve** , and view the published data.

...

26/3,K/38 (Item 2 from file: 635)
DIALOG(R)File 635:Business Dateline(R)

0675883 96-33041
Corporate profile for Optical Technology Group Inc.
Richeson, Laura
Business Wire (San Francisco, CA, US) p1
PUBL DATE: 960223
WORD COUNT: 501
DATELINE: Bethesda, MD, US, South Atlantic

TEXT:

...a flexible, efficient, mass storage solution that provides an intelligent file server interface to mass **storage** devices. DiskExtender manages **WORM** and read/write optical, tape, CD-ROM, and jukebox subsystems, transparent to the user.

CDExtender...

...visually connect to a CD-ROM or erasable optical jukebox, mount the selected media, and **retrieve** data. JukeMeister is OTG's entry level CD-ROM and erasable optical storage management solution...
...Any object (e.g., images, word processing files, spreadsheets, sound, video, etc.) can be stored, **retrieved** , mailed, printed, and faxed.

ColdExtender(TM)
   ColdExtender gives users the ability to **extract** , store, and **retrieve** ASCII computer reports. This process allows volumes of data to be stored on optical disk...

...electronically pre-
master COLD reports and image applications for publication to CD-ROM including all **indices** , databases, and viewer software. The finished CD contains everything necessary to sort, **retrieve** , and view the published data.

...

26/3,K/42 (Item 1 from file: 647)
DIALOG(R)File 647:CMP Computer Fulltext

01074305 CMP ACCESSION NUMBER: CRN19951204S0154
Consulting Services Buoy Resellers (Support & Training)
Tim Grace
COMPUTER RESELLER NEWS, 1995, n 661, PG33A
PUBLICATION DATE: 951204
JOURNAL CODE: CRN LANGUAGE: English
RECORD TYPE: Fulltext
SECTION HEADING: benchmarks -mass storage & boards
WORD COUNT: 1264

... completed.
"The biggest mistake our clients make is in thinking that by installing a new **storage** medium like CD- **WORM** all they need to do is scan files and store them," DiCioccio said. "We have to make them recognize that they need an **index** scheme that will enable them to easily **retrieve** information."
Once questions of storage methodology are answered, IPRO sells ongoing support that ranges from...

26/3,K/43 (Item 2 from file: 647)
DIALOG(R)File 647:CMP Computer Fulltext

00546929 CMP ACCESSION NUMBER: VAR19930614S5287
Setting the Army Straight (Variety)
Karen Balch
VARBUSINESS, 1993, n 909
PUBLICATION DATE: 930614
JOURNAL CODE: VAR LANGUAGE: English
RECORD TYPE: Fulltext
SECTION HEADING: News & Views

TEXT:
... the early 1900s. It compiled a huge amount of both paper and microfiche records, making **search** and **retrieval** a difficult chore. The problem was more than just unavailability. In 1973, a fire destroyed...

...network. Scanners are used to enter paper and microfiche records, and workstations were implemented for **indexing** and quality control. A RISC-based host and relational database management system are used to record, track and locate document images within the system. A collection of optical **storage** devices-both jukeboxes and standalone **WORM** drives-**store** the documents. Users access data through individual workstations, outputting to high -speed paper printers and...

26/3,K/44 (Item 3 from file: 647)
DIALOG(R)File 647:CMP Computer Fulltext

00518020 CMP ACCESSION NUMBER: NWC19920401S2178
Networked Multimedia (Feature 2)
Timothy Haight

NETWORK COMPUTING, 1992, n 304 , 70
PUBLICATION DATE: 920401
JOURNAL CODE: NWC LANGUAGE: English
RECORD TYPE: Fulltext
SECTION HEADING: Features
WORD COUNT: 3248

... also working on a separate application that will use the Metaview technology to scan and **store** invoices on the **WORM** drive. " Right now, we are **storing** the invoices and the check generated to pay each one on 16-mm film," Arnett...

...will write a link so that each invoice and check on the drive will be **indexed** with the check number and date, as they are stored in a database on the...

...the correct check number and date on the AS/400, then use that number to **retrieve** the image of the invoice and check through Metaview.
?

```
File   9:Business & Industry(R) Jul/1994-2005/Feb 03
         (c) 2005  The Gale Group
File  16:Gale Group PROMT(R) 1990-2005/Feb 04
         (c) 2005 The Gale Group
File  47:Gale Group Magazine DB(TM) 1959-2005/Feb 03
         (c) 2005 The Gale group
File 148:Gale Group Trade & Industry DB 1976-2005/Feb 03
         (c)2005 The Gale Group
File 160:Gale Group PROMT(R) 1972-1989
         (c) 1999 The Gale Group
File 275:Gale Group Computer DB(TM) 1983-2005/Feb 04
         (c) 2005 The Gale Group
File 570:Gale Group MARS(R) 1984-2005/Feb 04
         (c) 2005 The Gale Group
File 621:Gale Group New Prod.Annou.(R) 1985-2005/Feb 04
         (c) 2005 The Gale Group
File 636:Gale Group Newsletter DB(TM) 1987-2005/Feb 04
         (c) 2005 The Gale Group
File 649:Gale Group Newswire ASAP(TM) 2005/Jan 28
         (c) 2005 The Gale Group
? ds

Set     Items   Description
S1      65518   WORM OR WORMS OR WRITE()ONCE(1W)READ()MANY
S2       2434   S1(5N)(MEMORY? OR MEMORIES OR STORAGE?)
S3        783   S1(5N)(STORE OR STORES OR STORED OR STORING)
S4       1340   S1(5N)(ARCHIV? OR PRESTOR? OR WAREHOUS? OR HOUS??? ? OR CA-
            PTUR? OR RETAIN? OR COLLECT? OR PRESERV? OR ACCUMULAT? OR CUM-
            ULAT? OR AMASS?)
S5        578   S1(5N)(DEPOSIT? OR REPOSIT? OR SAVED OR SAVE? ? OR SAVING -
            OR DATABASE? OR DATASET? OR DATABANK? OR DATASTOR? OR DATAFIL-
            E? OR DATASYSTEM?)
S6          2   S1(5N)(DATACOLLECT? OR DATALIBRAR? OR DATAMART? OR STOREHO-
            US?)
S7         96   S1(5N)DATA()(BASE? ? OR SET? ? OR BANK? ? OR FILE? ? OR SY-
            STEM? ? OR LIBRAR? OR MART? ?)
S8    2755500   QUERY? OR QUERIE? ? OR SEARCH? OR SUBQUER? OR SUBSEARCH? OR
             RETRIEV? OR TEXTSEARCH? OR DATAMIN? OR IR OR HARVEST?
S9    1556195   INQUIR? OR ENQUIR? OR FETCH? OR INTERROGAT? OR REQUISITION?
             OR EXTRACT?
S10   1900785   MINE OR MINES OR MINED OR MINING
S11   1053276   INDEX? OR INDICIE? ? OR INDICE? ? OR SUBINDEX? OR SUBINDIC-
            E? OR SUBINDICIE? ?
S12   1214242   METAVALUE? OR METADATA? OR METATAG? ? OR TAG OR TAGS OR DE-
            SCRIPT?R? ? OR IDENTIFIER? OR CLASSIFY? OR CLASSIFIE? OR CLAS-
            SIFIC? OR TAXONOMY?
S13      8182   TAXONOMIE? OR TOPICTREE? OR META()(VALUE? ? OR DATA)
S14    119369   KEYFIELD? OR KEYDATA OR KEYWORD? OR KEYPHRASE? OR KEYTEXT?
            OR KEYTERM? OR KEYATTRIBUT? OR KEYPARAMET? OR KEYCRITER? OR K-
            EYCONCEPT? OR KEYTOPIC?
S15     69302   KEY()(FIELD? ? OR DATA OR WORD???? ? OR PHRASE? OR TEXT? ?
            OR TERM? ? OR TERMINOLOG? OR ATTRIBUTE? OR PARAMETER? OR CRIT-
            ERIA? OR CRITERION?)
S16     18123   KEY()(CONCEPT? ? OR TOPIC? ? OR SUBJECT? ? OR THEME? ?) OR
            KEYSUBJECT? OR KEYTHEME?
S17       561   S2:S7(S)S8:S10
S18        75   S17(S)S11
S19        20   S17(S)S12:S16
S20       624   S1(S)S11
S21        31   S20(S)S12:S16
S22        40   S19 OR S21
```

```
S23          6   S22/2002:2005
S24         34   S22 NOT S23
S25         24   RD (unique items)
S26          1   CDWORM?
?
```

25/3,K/1 (Item 1 from file: 47)
DIALOG(R)File 47:Gale Group Magazine DB(TM)
(c) 2005 The Gale group. All rts. reserv.

04553638 SUPPLIER NUMBER: 18545115
Indexing editorial cartoons.
Chapple-Sokol, Angie
Special Libraries, v87, n1, p21(11)
Wntr, 1996
ISSN: 0038-6723 LANGUAGE: English RECORD TYPE: Fulltext; Abstract
WORD COUNT: 6208 LINE COUNT: 00511

... Plans for the special collections database (SCDB) also include digitized images (on CD-WORM) and **key word** and Boolean searches. In addition, it "will accommodate multiple thesauri maintained in separate files (for....

25/3,K/4 (Item 4 from file: 47)
DIALOG(R)File 47:Gale Group Magazine DB(TM)
(c) 2005 The Gale group. All rts. reserv.

03809891 SUPPLIER NUMBER: 13034891 (USE FORMAT 7 OR 9 FOR FULL TEXT)
NetWare 4.0: a friendlier LAN. (local area networks; Novell Inc.'s network operating system) (Software Review) (Top of the News) (Evaluation)
Lauriston, Robert
PC World, v10, n12, p62(1)
Dec, 1992
DOCUMENT TYPE: Evaluation ISSN: 0737-8939 LANGUAGE: ENGLISH
RECORD TYPE: FULLTEXT; ABSTRACT
WORD COUNT: 572 LINE COUNT: 00046

... Storage System (HCSS) can combine data on different types of drives, such as hard disks, **WORM** drives, and optical jukeboxes, into a single logical volume. That means users can search on...

...files as if they were all on the same drive. To speed searches, HCSS includes " **index** cards" to describe the contents of a file. For example, you can attach **keywords** to scanned images. Built-in file compression and decompression reduces storage requirements.
NetWare 4.0...

25/3,K/5 (Item 5 from file: 47)
DIALOG(R)File 47:Gale Group Magazine DB(TM)
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03238258 SUPPLIER NUMBER: 07376284 (USE FORMAT 7 OR 9 FOR FULL TEXT)
Products. (text and image-retrieval software packages)
Frentzen, Jeffrey
PC Week, v6, n24, p95(2)
June 19, 1989
ISSN: 0740-1604 LANGUAGE: ENGLISH RECORD TYPE: FULLTEXT
WORD COUNT: 1921 LINE COUNT: 00153

... and 3Com 3+ LANs, Wang VS, Digital Equipment Corp. VMS and IBM VM systems.
Text- **retrieval** applications can be created for use with CD ROM, write once/read many (**WORM**), floppy-disk or hard-disk **storage** media. Text- **retrieval** features include the ability to create compressed **indexes**

and multiple databases. TextWare **indexes** every word, which eliminates the need for **key fields** . Optional add-in utility software includes text-preparation, data-security and **indexing** programs.

An optional external program allows the linking of graphics files with text information.

Pricing...

25/3,K/6 (Item 6 from file: 47)
DIALOG(R)File 47:Gale Group Magazine DB(TM)

03090834 SUPPLIER NUMBER: 06746115 (USE FORMAT 7 OR 9 FOR FULL TEXT)
Optical disk: a technology on the move. (includes a related article on records management at ICI Pharmaceuticals Group; another article profiles David McCurdy, who is responsible for Administrative Services at ICI Pharmaceuticals)
Dykeman, John
Modern Office Technology, v33, n6, p82(5)
June, 1988
ISSN: 0746-3839 LANGUAGE: ENGLISH RECORD TYPE: FULLTEXT; ABSTRACT
WORD COUNT: 3342 LINE COUNT: 00264

... of Sony Corp. of America (New York, NY) sees this development speeding up applications of **WORM** technology by allowing end users to move into optical storage with even greater confidence. Philips...

...responsiveness," says Wechter of Starion. . Elimination of lost and misfiled documents. "Once identified by an **index** , images cannot be lost or misfiled," explains Michael Skelton, vice president, Laser Optic Filing Systems, TAB Products Co. (Palo Alto, CA). **Indexing** multiple **key fields** allows cross referencing and flexible access," he adds. . No head crashes. Unlike magnetic disks, optical...

25/3,K/7 (Item 7 from file: 47)
DIALOG(R)File 47:Gale Group Magazine DB(TM)

02938718 SUPPLIER NUMBER: 05014712 (USE FORMAT 7 OR 9 FOR FULL TEXT)
Build savings as the WORM turns. (optical storage; write one, read many times)
Green, Timothy J.
Research & Development, v29, p80(3)
June, 1987
LANGUAGE: ENGLISH RECORD TYPE: FULLTEXT
WORD COUNT: 1717 LINE COUNT: 00131

... can help systematize data archiving and distribution, as well as provide high-capacity on-line **storage** .

When evaluating **WORM** systems, a user should look carefully at the software that comes with it. Storing large...

...access to them. For example, we provide a text-management system that lets the user **search** the data base by **key words** or by phrases. To handle the **WORM** disks' large capacity, the software can **index** up to a million unique words, and it can handle up to 300,000 documents...

25/3,K/11 (Item 4 from file: 148)

DIALOG(R)File 148:Gale Group Trade & Industry DB
(c)2005 The Gale Group. All rts. reserv.

08182543 SUPPLIER NUMBER: 17547851 (USE FORMAT 7 OR 9 FOR FULL TEXT)
AT&T Teams Up with Aegis Star to Unveil Breakthrough Storage and Retrieval System for Network Users; -- AT&T Easy Archiving Employs Fastest Document Retrieval Technology for Value-Added Networks --.
Business Wire, p10101105
Oct 10, 1995
LANGUAGE: English RECORD TYPE: Fulltext
WORD COUNT: 595 LINE COUNT: 00061

... mail address to the message. To retrieve a document, customers can choose a variety of **key field identifiers** that trigger high-speed **search** capabilities within the Aegis Star database.
"There is a growing realization that back-up storage...

...if not weeks.
Aegis Star's technology captures very large volumes of electronic transactions, creates **index** fields and stores the information on **WORM** disks off-site as it is being transmitted over AT&T's EasyLink network. A ...

...document's originating company, along with a date and time stamp, and up to seven **identifiers** .
"AT&T Easy Archiving is as easy to use as an ATM," said Bill Bankert ...

25/3,K/14 (Item 7 from file: 148)
DIALOG(R)File 148:Gale Group Trade & Industry DB
(c)2005 The Gale Group. All rts. reserv.

05539466 SUPPLIER NUMBER: 11286860 (USE FORMAT 7 OR 9 FOR FULL TEXT)
New masters of image management. (search, retrieval, storage of digital image files)
Carli, Donald
Graphic Arts Monthly, v63, n9, p96(1)
Sept, 1991
ISSN: 1047-9325 LANGUAGE: ENGLISH RECORD TYPE: FULLTEXT
WORD COUNT: 635 LINE COUNT: 00051

... permanently archived on a Panasonic WORM jukebox with 47 Gigabytes of capacity and indexed by **key word** .
Many aspects of "on-line" image management are common to a rapidly expanding range of...

25/3,K/15 (Item 8 from file: 148)
DIALOG(R)File 148:Gale Group Trade & Industry DB
(c)2005 The Gale Group. All rts. reserv.

05479937 SUPPLIER NUMBER: 11440635 (USE FORMAT 7 OR 9 FOR FULL TEXT)
Cherokee debuts MS-DOS WORM drive. (Cherokee Data Systems Inc.'s Electronic Filing System document management system and new 3.5-inch rewritable optical drive for MS-DOS microcomputers) (product announcement)
Morgan, Cynthia
Government Computer News, v10, n21, p29(1)
Oct 14, 1991
DOCUMENT TYPE: product announcement ISSN: 0738-4300 LANGUAGE:

ENGLISH RECORD TYPE: FULLTEXT
WORD COUNT: 258 LINE COUNT: 00020

... about 17 seconds to scan one page, lets users file and cross-reference documents by **keywords** or other **index** information. A single **WORM** disk can hold 16,000 typed pages.
The company's new 3 1/2-inch...

25/3,K/16 (Item 9 from file: 148)
DIALOG(R)File 148:Gale Group Trade & Industry DB
(c)2005 The Gale Group. All rts. reserv.

04520847 SUPPLIER NUMBER: 08539129 (USE FORMAT 7 OR 9 FOR FULL TEXT)
The footsore searcher tours Online '89 exhibits: day one. (includes related articles)
Quint, Barbara
Database Searcher, v6, n1, p10(17)
Jan, 1990
ISSN: 0891-6713 LANGUAGE: ENGLISH RECORD TYPE: FULLTEXT
WORD COUNT: 10387 LINE COUNT: 00866

... technological database. When complete, they will re-achive all data back to 1969, mapping old **classification** codes to current codes. Inspec staff are building the new files using WORM (Write-Once-Read-Many) optical disks in-house. When complete, all **search** services carrying Inspec -- BRS (INSP, INSZ), CEDOCAR, DIALOG (File 12, 13), ESA-IRS (Files 8...

...some time to complete, as did 1989's major innovation of inserting chemical and numerical **indexing** fiedls.
The descriptions will remain tied to tose current at the date of a record...

25/3,K/17 (Item 1 from file: 275)
DIALOG(R)File 275:Gale Group Computer DB(TM)
(c) 2005 The Gale Group. All rts. reserv.

01934318 SUPPLIER NUMBER: 18213002 (USE FORMAT 7 OR 9 FOR FULL TEXT)
Foundations of imaging systems. (includes glossary of imaging terms and standards) (Technology Information) (Cover Story)
Fullerton, Larry
Network VAR, v4, n4, p35(8)
April, 1996
DOCUMENT TYPE: Cover Story ISSN: 1082-8818 LANGUAGE: English
RECORD TYPE: Fulltext; Abstract
WORD COUNT: 4721 LINE COUNT: 00391

... image links. * E-mail support for images and text with Mailview image viewer. * An open **storage** architecture that supports **WORM** , jukebox magneto-optical, or CD-ROM technologies. * Advanced database **search** options, including fuzzy logic **search** , CD-ROM **search** speed enhancements, file comments, the ability to save and reuse concepts and contents from previous **searches** , and combination **searches** that allow users to mix **key fields** , concepts, and progressive **searches** . * Front-end integration from OmniPage, batch processing support, automatic CD-ROM publication, fax support (including...
? t25/3,k/21-24

25/3,K/21 (Item 5 from file: 275)

DIALOG(R)File 275:Gale Group Computer DB(TM)
(c) 2005 The Gale Group. All rts. reserv.

01360473 SUPPLIER NUMBER: 08441640 (USE FORMAT 7 OR 9 FOR FULL TEXT)
Backups: can you ever be too safe? (backing up data in UNIX installations)
Hume, Andrew
UNIX Review, v8, n5, p54(5)
May, 1990
ISSN: 0742-3136 LANGUAGE: ENGLISH RECORD TYPE: FULLTEXT; ABSTRACT
WORD COUNT: 2342 LINE COUNT: 00178

... Science Research Center, where he has done research on pattern-matching, particularly the case of **keyword** searches; mk, a smaller, faster, but more general replacement for make; and on the File Motel, a **WORM** -based file backup-restore- **archive** system. As to his present work, Hume admits to having no responsibilities as such--"except...

25/3,K/22 (Item 1 from file: 636)
DIALOG(R)File 636:Gale Group Newsletter DB(TM)
(c) 2005 The Gale Group. All rts. reserv.

03067010 Supplier Number: 46268654 (USE FORMAT 7 FOR FULLTEXT)
Imaged documents code
Computer Fraud & Security Bulletin, pN/A
April 1, 1996
Language: English Record Type: Fulltext
Document Type: Newsletter; Trade
Word Count: 613

Potentially Image Document Management devices, whereby the paper original is scanned as an image onto **write - once / read - many** (**WORM**) media, appear to be very attractive. The source material can be **indexed** for subsequent retrieval by **keywords** and the **WORM** media can be readily backed up. Customers thus simultaneously obtain space-saving, speed and ease...

25/3,K/23 (Item 2 from file: 636)
DIALOG(R)File 636:Gale Group Newsletter DB(TM)
(c) 2005 The Gale Group. All rts. reserv.

02887210 Supplier Number: 45863767 (USE FORMAT 7 FOR FULLTEXT)
DOCUMENT MANAGEMENT: AT&T TEAMS UP WITH AEGIS STAR TO UNVEIL BREAKTHROUGH STORAGE & RETRIEVAL SYSTEM FOR NETWORK USERS; AT&T EASY ARCHIVING EMPLOYS FASTEST DOCUMENT RETRIEVAL TECHNOLOGY FOR VALUE-ADDED NETWORKS
EDGE: Work-Group Computing Report, v6, n282, pN/A
Oct 16, 1995
Language: English Record Type: Fulltext
Document Type: Newsletter; Trade
Word Count: 621

... optical disks that cannot be manipulated. Aegis Star will provide customers with triple backup on **WORM** disks.

With Easy **Archiving** , AT&T Mail and AT&T EDI customers can simultaneously send and store any document by simply adding the Aegis e-mail address to the message. To **retrieve** a document, customers can choose a variety of **key field identifiers** that trigger high-speed **search** capabilities within the Aegis Star database.

"There is a growing realization that back-up storage...

...if not weeks.
Aegis Star's technology captures very large volumes of electronic transactions, creates **index** fields and stores the information on **WORM** disks off-site as it is being transmitted over AT&T's EasyLink network. A
...

...document's originating company, along with a date and time stamp, and up to seven **identifiers** .
"AT&T Easy Archiving is as easy to use as an ATM," said Bill Bankert
...

25/3,K/24 (Item 3 from file: 636)
DIALOG(R)File 636:Gale Group Newsletter DB(TM)

02208977 Supplier Number: 44190176 (USE FORMAT 7 FOR FULLTEXT)
TechKNOWLOGY Releases Jukebox Management Software and SmartCOLD
Optical Memory News, n148, pN/A
Oct 26, 1993
Language: English Record Type: Fulltext
Document Type: Newsletter; Trade
Word Count: 124

(USE FORMAT 7 FOR FULLTEXT)
TEXT:
...Jukebox Management Software (JMS) to eliminate Novell network bottlenecks in imaging systems that use both **WORM** and rewritable jukeboxes. Improvements are the result of an enhanced intelligent caching system, which speeds...

...for the selected jukebox. Pricing starts at $12,500. SmartCOLD for Windows automatically creates an **index** based on **keywords** found in the data when it is downloaded onto optical disks. The software requires Windows...

02938718 SUPPLIER NUMBER: 05014712 (THIS IS THE FULL TEXT)

Build savings as the WORM turns. (optical storage; write one, read many times)

Green, Timothy J.

Research & Development, v29, p80(3)
June, 1987
LANGUAGE: ENGLISH RECORD TYPE: FULLTEXT
WORD COUNT: 1717 LINE COUNT: 00131

TEXT:

Build savings as the WORM turns

OPTICAL DATA STORAGE--in particular, technology using the new WORM (write once, read many times) optical disks--is changing the way in which engineers and scientists think about storing data for the computers they use. An optical disk's high storage capacity, low cost/Mbyte of storage, compact size, and data security make it an important supplement to virtually every personal computer with a hard disk.

Optical technology is a well-understood, proven method of data storage. Its development began more than a decade ago. Since then, entrepreneurs have brought to market a steady stream of products, including video disk players, laser disks, high-fidelity compact audio disks and, now, data-storage systems. Today, there are hundreds of thousands of optical devices in use.

Optical data-storage systems have two characteristics that make them ideal for scientific applications: Their extremely high storage capacity typically is 10 to 20 times that of a standard PC's hard disk, and their cost/Mbyte of storage is much less than that of hard disks.

The standard 5.25-in.-dia, double-sided WORM optical disk can hold more than 200 Mbytes of data, compared with only 360 kbytes for a 5.25-in.-dia flexible disk or 10 to 20 Mbytes for a Winchester disk. The capability of storing 200 Mbytes of data is about equal to the capacity of 600 flexible disks, about 100,000 sheets of paper, or eight full four-drawer file cabinets.

Of course, a WORM optical disk costs more than a Winchester disk or a flexible-disk drive. Still, the WORM is far more economical in terms of cost/Mbyte of storage capacity. Even at almost five times the initial cost of a Winchester disk, the cost/Mbyte for the optical disk is less than half that of the hard disk and only about 4% that of flexible disk storage.

Before you decide to evaluate optical-storage systems for scientific applications, you will want to understand the types of optical disk systems that are available. Two of the technologies already are on the market: WORM and CD-ROM (compact disk, read only memory). The third type, called simply read/ write, still is being developed.

The WORM optical disks now available provide about 120 Mbytes of storage on each side. Once they are written, data are permanently stored and accessible, giving users a way to track historical information-- an important consideration for archiving the results of experiments and simulations. Data stored on a flexible disk can be written over or accidently erased.

In additon, the user can obtain data randomly from an optical disk. Thus, information is available much more quickly than it is from tape.

Write-once data storage is based on a simple concept. A laser burns a hole into the surface of a disk, making the data permanent and secure. The data cannot be erased or overwritten. Short of destroying the cartridge itself, the data cannot be lost.

The removable cartridge is only slightly larger than a 5.25-in.-dia diskette, and the optical disk storage is much less volatile. Therefore, the optical disk can be shipped easily and stored safely without some of the concerns one encounters in storing or shipping magnetic media.

For example, it is obvious that data written optically cannot be lost

through accidental exposure to magnetic fields. Likewise, head crashes are impossible because an optical disk system does not have a read/ write head to come into contact with the disk surface. In addition, optical disk systems can operate across a wide range of environmental conditions, and they can tolerate dust and other contaminants better than magnetic media can.

Optical disk options

Today's only other optical technology produces read-only optical disks by using the same techniques as are used in manufacturing audio disks for the consumer market.

Data stored on CD-ROMs are permanent and unalterable. Each disk holds 600 Mbytes of data--about three times as much as a present-day WORM optical system and 15 to 30 times the capacity of a magnetic disk. One reason for the greater capacity is that CD-ROMs are produced under ideal recording conditions, and the data are formatted as a continual, closely packed string along a spiral groove.

The greatest drawback of CD-ROMs is that they are considerably slower than are most other recording media now in use in computers.

In the near future--late 1987 or early 1988-- read/write optical disks will become available. These devices will have many times the capacity of magnetic disks without any of the drawbacks. Still, it is too early to compare the cost/performance features with those of the WORM and CD-ROM types.

Thus, each type of optical disk has its own advantages and disadvantages. CD-ROMs are best used for large, stable data bases that are used frequently--e.g., reference works, scientific papers, or documentation. Since CD-ROMs are expensive to produce, we would expect to use them only when a large number of disks is needed.

As a general rule, CD-ROMs are easy to use because most of them are menu-driven. For example, a 20-volume, 9 million-word encyclopedia, available on a single CD-ROM disk, uses a simple search utility to help the user find and review material. More-comprehensive productions interweave short video segments with the text.

When WORM fits

Engineers and scientists who are evaluating WORM systems have to ask themselves whether write-once technology can be used where every previous medium has offered virtually unlimited read/write capabilities. That is, the WORM concept forces users to analyze how they use data.

For example, if the value of a data base is in its stability, and the data base is not updated frequently (often the case in scientific applications), a WORM optical disk might be ideal. If, on the other hand, it is necessary to update the data base frequently, then WORM optical storage may not be the best solution.

Many computer users pay close attention to data files that they revise constantly, but they often forget that they are accumulating vast amounts of data on their systems' hard disks, or on flexible disks kept in desk drawers and on shelves. For this type of user, WORM optical disks can help systematize data archiving and distribution, as well as provide high-capacity on-line storage.

When evaluating WORM systems, a user should look carefully at the software that comes with it. Storing large volumes of data requires a straightforward way of obtaining access to them. For example, we provide a text-management system that lets the user search the data base by key words or by phrases. To handle the WORM disks' large capacity, the software can index up to a million unique words, and it can handle up to 300,000 documents/data base.

Embedded servo

From a technical standpoint, WORM optical disks differ from CD-ROM disks in the way in which they format data. As we noted earlier, a CD-ROM records data along a spiral groove like that on a phonograph record. And a space in a portion of the groove separates segments of data in much the same manner as a space separates tracks on a long-playing phonograph record.

Instead of grooves, a WORM disk uses an "embedded servo' as a more reliable way of assuring accurate laser-head-to-track alignment. When it is formatting a WORM disk, a laser burns a pair of pits along the two sides of the track. These pits act like guardrails on a narrow road.

The servo path guides the read/write head with great precision, assuring the head-to-track alignment necessary for reliable reading. The embedded servo also helps to assure that disks can be interchanged from one drive to another.

In addition, WORM optical-disk systems use sophisticated error-correction algorithms to ensure data reliability. Thus, the combination of the embedded servo and the error-correction codes allows WORM optical drives to spin faster than CD-ROMs can. The result is that WORM drives have a higher transfer rate between the disk and the PC than CD-ROMs can achieve. That is, with a WORM drive, the user gets the data faster.

As we indicated above, the WORM user has to consider how to handle updates of existing data bases. The problem can arise when a user wants to change part of a file. This is the most common type of update required.

For example, if the user finds an error in the file, it becomes a question of whether to rewrite the entire file or to append the correct entry to the existing file.

For magnetic-disk storage, the traditional approach would be to append the correction to the existing file. With optical disks, however, we can take advantage of the huge storage capacity and recopy the entire file without fear of wasting valuable storage space.

Audit trail

There are several advantages to recopying when the opportunity is presented. It is easy, of course. More importantly, recopying provides an audit trail that lets the user trace data alterations back through various revisions. This capability is especially important for archiving the results of experiments for later comparison or for patent documentation. For such applications, historical data are needed, including all revisions and updates.

In any case, engineers and scientists have to avaluate the various optical technologies for the unique benefits each offers. Considering issues such as overall capacity, speed, cost, and disk interchangeability--and relating these features to their own operations--will help accountants select the optical storage technology that best matches their company's requirements.

Table: Storage costs

Photo: A HIGH-SPEED write-once, read-many-times (WORM) optical disk storage system provides 230 Mbytes of storage capacity for an IBM "PC' or a PC-compatible computer.

CAPTIONS: Storage costs. (table)

SPECIAL FEATURES: illustration; table; photograph

DESCRIPTORS: Optical disks--Usage; Engineering research--Data processing; Information storage and retrieval systems--Purchasing; Research--Data processing; Optical data processing--Usage

FILE SEGMENT: MI File 47

?

05539466 SUPPLIER NUMBER: 11286860 (THIS IS THE FULL TEXT)

New masters of image management. (search, retrieval, storage of digital image files)

Carli, Donald

Graphic Arts Monthly, v63, n9, p96(1)
Sept, 1991
ISSN: 1047-9325 LANGUAGE: ENGLISH RECORD TYPE: FULLTEXT
WORD COUNT: 635 LINE COUNT: 00051

TEXT:

Publicity photos of color separators standing before their multi-million dollar prepress imaging systems were all the rage in the 1980s. As they cloned, composited, and color-corrected their way into the '90s, they propelled prepress imaging to new levels of excellence and modified their own images in the process.

Image management, though some might think the term refers to publicity photos, in fact refers to the categorization, archiving, search, retrieval, and distribution of digital image files and associated data.

Image management systems come in two basic flavors: "off-line" or "archived" image data, and "on-line" image data. Although off-line archive management is important, the most significant challenges and opportunities will be found in the on-line management of digital images, documents, graphics, and associated data in networked environments.

Regardless of what format digital images ae stored in, or what media they are stored on, they can be handled as objects identified by a unique index number and a key file or abstract much as the Library of Congress identifies publications by their ISBN number. Tools and techniques for the taming of tape and disk archives in such a manner range from flatfile, relational, and object oriented database toolkits to turnkey image management systems tailored to the requirements of a broad range of vertical markets. So, who are some of the players?

The George Banta Company, a printing firm, has moved beyond planning. It acquired a majority stake in the Knowledge Set Corporation of Mountainview, Calif. Knowledge Set is a leader in CD-ROM publishing, and in the development of image management and full-text search and retrieval software for IBM, Apple, and UNIX systems.

3M printing and publishing systems currently has a solution for managing prepress tape and disk archives in field trial. It is a software package for the Macintosh II called "Image Access." Image Access extracts information from tape header files and automaticaly enters information about file size, job number, format, etc., into the database "card catalog" or "key file."

Bestinfo, Inc. of Media, Pa., recently announced an image database application for PC platforms runnings under OS/2 called "Picbase", which is able to manage both off-line prepress data files and on-line images. Aimed primarily at catalog publishing, retail advertising, and database merchandising applications, it is designed to be used by itself, or as an adjunct to the company's PageWright publishing system.

Micro Dynamics, Ltd. of Silver Spring, Md. is one of the leaders in the field of departmental on-line image management systems. Its systems run on the Macintosh platform, and typically serve between 50 and 100 users. Micro's MD MARS system is the first such system to support the JPEG standard. The Spanish newspaper El Sol uses a Micro Dynamics MARS system to store wire service pictures and information from other newspapers.

The newspaper collects over 400 wire pictures every day, of which 250 are permanently archived on a Panasonic WORM jukebox with 47 Gigabytes of capacity and indexed by key word.

Many aspects of "on-line" image management are common to a rapidly expanding range of markets and applications, due to the growing popularity and functionality of open systems, imaging standards, and protocols for networked computing.

One must look beyond the graphic arts industry in the development of a strategic outlook toward image management, since image management technology has such broad application, and such central significance in the information age. Regardless of the size or nature of your digital imaging activities, you cannot afford to be without an opinion or a plan. The revolution is outside the door.

Carli is president of Nima Hunter, New York.

INDUSTRY CODES/NAMES: PUBL Publishing; ARTS Arts and Entertainment
DESCRIPTORS: Prepress services industry--Equipment and supplies
SIC CODES: 2759 Commercial printing, not elsewhere classified
FILE SEGMENT: TI File 148

?

02887210 Supplier Number: 45863767 (THIS IS THE FULLTEXT)

DOCUMENT MANAGEMENT: AT&T TEAMS UP WITH AEGIS STAR TO UNVEIL BREAKTHROUGH STORAGE & RETRIEVAL SYSTEM FOR NETWORK USERS; AT&T EASY ARCHIVING EMPLOYS FASTEST DOCUMENT RETRIEVAL TECHNOLOGY FOR VALUE-ADDED NETWORKS

EDGE: Work-Group Computing Report, v6, n282, pN/A
Oct 16, 1995
Language: English Record Type: Fulltext
Document Type: Newsletter; Trade
Word Count: 621

TEXT:

AT&T and Aegis Star Corporation Tuesday announced AT&T Easy Archiving, a breakthrough storage and retrieval service for E-mail and electronic data interchange (EDI). Powered by the global messaging capabilities of AT&T EasyLink Services, AT&T Easy Archiving is the only service that:

* employs a unique indexing system that accesses documents within a database regardless of size in approximately 15 seconds.

* meets the most recent government regulations(a) on archiving that designated industries must comply with.

* eliminates the major capital investment traditionally incurred in the purchase and upkeep of high-capacity storage and retrieval systems.

Aegis Star Corp., a leader in high-capacity, high-speed storage and retrieval, is offering AT&T Easy Archiving exclusively in conjunction with AT&T. AT&T Easy Archiving will use Aegis Star's patent-pending technology to deliver the highest speed retrieval in the industry and secure and cost-efficient storage for meeting legal requirements.

AT&T Easy Archiving is designed to meet the rapidly-growing storage and retrieval needs of electronic mail and EDI traffic. AT&T Easy Archiving will be particularly useful in manufacturing, healthcare and transportation industries and for legal, financial and government institutions required by law to store non-tamperable documents in third-party systems for a designated period of time. AT&T Easy Archiving uses write-once, read-many (WORM) optical disks that cannot be manipulated. Aegis Star will provide customers with triple backup on WORM disks.

With Easy Archiving, AT&T Mail and AT&T EDI customers can simultaneously send and store any document by simply adding the Aegis e-mail address to the message. To retrieve a document, customers can choose a variety of key field identifiers that trigger high-speed search capabilities within the Aegis Star database.

"There is a growing realization that back-up storage is critical to today's computing environment," said Kathleen Earley, vice president of AT&T's Business Multimedia Group Services. "The result is a proliferation of systems that have no standards and that are providing short-term solutions for high-capacity storage today. AT&T Easy Archiving offers users the advantages of unlimited long-term storage capacity, cost efficiency and quick delivery within a matter of hours." Earley noted that the normal wait time to receive either hard copy or electronic documents that have been stored in warehouses, on microfilm or in large databases often takes days, if not weeks.

Aegis Star's technology captures very large volumes of electronic transactions, creates index fields and stores the information on WORM disks off-site as it is being transmitted over AT&T's EasyLink network. A storage code uniquely identifies the document's originating company, along with a date and time stamp, and up to seven identifiers.

"AT&T Easy Archiving is as easy to use as an ATM," said Bill Bankert, president of Aegis Star. "And, customers save money and time. They don't have to worry about transferring files to a new system due to obsolete hardware and software because transport is completely network-based and capacity is

unlimited."

Aegis Star Corporation, headquartered in Palo Alto, California, was founded in 1994 to provide a proprietary electronic data capture, storage and retrieval archival service not currently available on the marketplace. The company employs 32 personnel, many of whom have expertise in software engineering, specifically in information storage and retrieval technology and services and in media and database design.

AT&T is the world's networking leader, providing communications services and products, as well as network equipment and computer systems, to businesses, consumers, telecommunications service providers and government agencies. The company's AT&T EasyLink Services offerings include electronic mail, enhanced fax, electronic data interchange, public information services and telex, with connections to more than 160 countries.

(a): Government regulation codes issued: UCC4a; IRS Section 6001, Rev,91-59; National Archives and Records Administration

PUBLISHER NAME: EDGE Publishing

INDUSTRY NAMES: BUSN (Any type of business); CMPT (Computers and Office Automation); TELC (Telecommunications)

?

03067010 Supplier Number: 46268654 (THIS IS THE FULLTEXT)

Imaged documents code

Computer Fraud & Security Bulletin, pN/A
April 1, 1996
ISSN: 0142-0496
Language: English Record Type: Fulltext
Document Type: Newsletter; Trade
Word Count: 613

TEXT:

Well into the next millennium large organizations in both the public and private sectors will need to collect and retain vast quantities of paper-based documents. Contracts, deeds, securities certificates, insurance proposal forms as well as many different types of government record will continue to be originated on paper and signed and witnessed by hand-written signatures.

Potentially Image Document Management devices, whereby the paper original is scanned as an image onto write-once/read-many (WORM) media, appear to be very attractive. The source material can be indexed for subsequent retrieval by keywords and the WORM media can be readily backed up. Customers thus simultaneously obtain space-saving, speed and ease of retrieval, and back-up in the event of disaster.

The big drawback problem has been doubt whether the stored and retrieved documents would be admissible in legal proceeding. This has so far limited take-up of the technology to just a few industries, such as pharmaceuticals, whilst many other potential users have held back. Among the legal difficulties: a concern about the validity of 'copies of copies', the operation of the 'best evidence' rule which says that where-ever possible originals should be provided; and particular difficulties in UK law about the presentation of computer-derived evidence in court and in particular the need for certificates of proper working. In addition there are practical concerns: how can one prove that the image document is authentic, or that it hasn't been tampered with -accidentally or deliberately?

Two events in February 1996 have gone a long way to making Image Document Management technology more acceptable. The first is the new UK Civil Evidence Act, due to come into force later in the year and which replaces the older 1968 Act. The requirement for certification of proper working of a computer disappears, with much more emphasis being placed on the court' s interpretation of the weight as opposed to admissibility of evidence. At the same time a much more flexible approach is taken towards the concept of a 'business record' -- essentially organizations can make their own determination (subject to provisions in general companies, securities and tax laws) about the form in which they keep their records.

Section 8 of the new Act also allows free use of copies of copies, provided the original and the chain of copying can be authenticated.

BSI/DISC (British Standards Institute) have now issued a Code of Practice for Legal Admissibility of Information Stored on Electronic Document Management Systems (DISC) PDA0008. This is the result of work by the Document Management Forum (DMF), Image and Document Management Association (IDMA), the Legal Images Initiative consortium (LII) and the United Kingdom Association for Information and Image Management (UKAIIM).

The Code has had to strike a difficult balance between producing general principles which will last the test of time and specific guidance in the use of particular products available now. The principle headings cover: Representation of Information, Duties of Care, Business Procedures and Processes, Enabling Technologies, Audit Trails. The Code also includes

explanations of some of the specific technologies involved and a glossary.

BSI expect that, just as PD0003 became BS7799, the Information Security Management Code, so PD0008 will, after the present period of consultation, also make the transition to being a British Standard. Already discussions are taking place with other standards-making bodies for the ideas to be taken up on an international level.

DISC PD0008, ISBN 0 580 25705 3, available from HMSO and BSI; further information in Principles of Good Practice for Information Management by Bill Mayon-White and Bernard Dyer for the Image and Document Management Association, GBP25, available from IDMA, c/o London School of Economics; tel: +44 171 955 7788.

Subscription: $204 per year as of 1/92. Published monthly. Contact Elsevier Advanced Technology Publications, Crown House, Linton Road, Barking, Essex, IG11 8JU, U.K. Phone 01-594-7272.

PUBLISHER NAME: Elsevier Science, Inc.

INDUSTRY NAMES: BUSN (Any type of business); CMPT (Computers and Office Automation); GOVT (Government and Law); INTL (Business, International)

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File   6:NTIS 1964-2005/Jan W5
         (c) 2005 NTIS, Intl Cpyrght All Rights Res
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         (c) 2005 Institution of Electrical Engineers
File   8:Ei Compendex(R) 1970-2005/Jan W3
         (c) 2005 Elsevier Eng.  Info. Inc.
File  34:SciSearch(R) Cited Ref Sci 1990-2005/Jan W5
         (c) 2005 Inst for Sci Info
File  35:Dissertation Abs Online 1861-2005/Jan
         (c) 2005 ProQuest Info&Learning
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         (c) 2005 BLDSC all rts. reserv.
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File  95:TEME-Technology & Management 1989-2005/Jan W1
         (c) 2005 FIZ TECHNIK
File  99:Wilson Appl. Sci & Tech Abs 1983-2004/Nov
         (c) 2005 The HW Wilson Co.
File 111:TGG Natl.Newspaper Index(SM) 1979-2005/Feb 01
         (c) 2005 The Gale Group
File 144:Pascal 1973-2005/Jan W5
         (c) 2005 INIST/CNRS
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         (c) 2004 Info.Sources Inc
File 266:FEDRIP 2004/Oct
         Comp & dist by NTIS, Intl Copyright All Rights Res
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         (c) 1998 Inst for Sci Info
File 438:Library Lit. & Info. Science 1984-2004/Nov
         (c) 2005 The HW Wilson Co
File 483:Newspaper Abs Daily 1986-2005/Feb 05
         (c) 2005 ProQuest Info&Learning
File 583:Gale Group Globalbase(TM) 1986-2002/Dec 13
         (c) 2002 The Gale Group
File 603:Newspaper Abstracts 1984-1988
         (c)2001 ProQuest Info&Learning

Set     Items   Description
S1      40052   WORM OR WORMS OR WRITE()ONCE(1W)READ()MANY
S2        587   S1(5N)(MEMORY? OR MEMORIES OR STORAGE?)
S3        108   S1(5N)(STORE OR STORES OR STORED OR STORING)
S4        760   S1(5N)(ARCHIV? OR PRESTOR? OR WAREHOUS? OR HOUS??? ? OR CA-
              PTUR? OR RETAIN? OR COLLECT? OR PRESERV? OR ACCUMULAT? OR CUM-
              ULAT? OR AMASS?)
S5        241   S1(5N)(DEPOSIT? OR REPOSIT? OR SAVED OR SAVE? ? OR SAVING -
              OR DATABASE? OR DATASET? OR DATABANK? OR DATASTOR? OR DATAFIL-
              E? OR DATASYSTEM?)
S6          0   S1(5N)(DATACOLLECT? OR DATALIBRAR? OR DATAMART? OR STOREHO-
              US?)
S7         20   S1(5N)DATA()(BASE? ? OR SET? ? OR BANK? ? OR FILE? ? OR SY-
              STEM? ? OR LIBRAR? OR MART? ?)
S8    1834097   QUERY? OR QUERIE? ? OR SEARCH? OR SUBQUER? OR SUBSEARCH? OR
               RETRIEV? OR TEXTSEARCH? OR DATAMIN? OR IR OR HARVEST?
S9    1372796   INQUIR? OR ENQUIR? OR FETCH? OR INTERROGAT? OR REQUISITION?
               OR EXTRACT?
S10    424557   MINE OR MINES OR MINED OR MINING
S11   1385721   INDEX? OR INDICIE? ? OR INDICE? ? OR SUBINDEX? OR SUBINDIC-
              E? OR SUBINDICIE? ?
S12   1387717   METAVALUE? OR METADATA? OR METATAG? ? OR TAG OR TAGS OR DE-
              SCRIPT?R? ? OR IDENTIFIER? OR CLASSIFY? OR CLASSIFIE? OR CLAS-
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SIFIC? OR TAXONOMY?
S13 17535 TAXONOMIE? OR TOPICTREE? OR META()(VALUE? ? OR DATA)
S14 40153 KEYFIELD? OR KEYDATA OR KEYWORD? OR KEYPHRASE? OR KEYTEXT? OR KEYTERM? OR KEYATTRIBUT? OR KEYPARAMET? OR KEYCRITER? OR KEYCONCEPT? OR KEYTOPIC?
S15 29055 KEY()(FIELD? ? OR DATA OR WORD???? ? OR PHRASE? OR TEXT? ? OR TERM? ? OR TERMINOLOG? OR ATTRIBUTE? OR PARAMETER? OR CRITERIA? OR CRITERION?)
S16 8413 KEY()(CONCEPT? ? OR TOPIC? ? OR SUBJECT? ? OR THEME? ?) OR KEYSUBJECT? OR KEYTHEME?
S17 1 CDWORM?
S18 248 S2:S7 AND S8:S10
S19 17 S18 AND S11
S20 22 S18 AND S12:S16
S21 603 (S1 OR S17) AND S11
S22 51 S21 AND S12:S16
S23 84 S19:S20 OR S22
S24 9 S23/2002:2005
S25 75 S23 NOT S24
S26 62 RD (unique items)

26/7/4 (Item 4 from file: 6)
DIALOG(R)File 6:NTIS

1773222 NTIS Accession Number: DE93017880
Networked MS Windows 3.1 based Classified **Document Control System (CDOCS)**
Desonier, L. M.
Sandia National Labs., Albuquerque, NM.
Corp. Source Codes: 068123000; 9511100
Sponsor: Department of Energy, Washington, DC.
Report No.: SAND-93-1701C; CONF-930749-16
1993 3p
Languages: English Document Type: Conference proceeding
Journal Announcement: GRAI9404; ERA9403
Annual meeting of the Institute of Nuclear Materials Management (34th), Scottsdale, AZ (United States), 18-21 Jul 1993. Sponsored by Department of Energy, Washington, DC.
Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
NTIS Prices: PC A01/MF A01
Country of Publication: United States
Contract No.: AC04-76DP00789
Current **classified** document management systems require a tremendous amount of space and extensive manpower to account for, inventory, and protect the documents. Comprehensive analysis of current control and accountability procedures reveal the main problem is the actual handling of the paper itself. The purpose of the Networked Microsoft Windows 3.1 based **Classified** Document Control System (CDOCS) is to eliminate the paper by scanning and storing images of pages on a personal computer using (open quotes)write once read mostly(close quotes) (**WORM**) high density optical media. By **saving** images on the computer, not only can manpower and space requirements be reduced, but the chance of compromise is diminished. As an added benefit, the information is now more readily available to the authorized user and is provided to the user at the user's PC. The network target for CDOCS is Microsoft Windows for Workgroups. Thus, the system is also readily applicable to unclassified document imaging uses.

26/7/17 (Item 2 from file: 2)
DIALOG(R)File 2:INSPEC

7028967 INSPEC Abstract Number: A2001-19-9365-008, C2001-10-7340-025
Title: Earth System Science Workbench: a data management infrastructure for earth science products
Author(s): Frew, J.; Bose, R.
Author Affiliation: Sch. of Environ. Sci. & Manage., California Univ., Santa Barbara, CA, USA
Conference Title: Proceedings Thirteenth International Conference on Scientific and Statistical Database Management. SSDBM 2001 p.180-9
Editor(s): Kerschberg, L.; Kafatos, M.
Publisher: IEEE Comput. Soc, Los Alamitos, CA, USA
Publication Date: 2001 Country of Publication: USA x+279 pp.
ISBN: 0 7695 1218 6 Material Identity Number: XX-2001-01603
U.S. Copyright Clearance Center Code: 0 7695 1218 6/2001/$10.00
Conference Title: Thirteenth International Conference on Scientific and Statistical Database Management. SSDBM 2001
Conference Sponsor: Center for Earth Observing & Space Res.; Center for Inf. Syst. Integration & Evolution; E-Center for E-Business; George Mason Univ.; ACM SIGMOD; IEEE TC on Data Eng.; VLDB Endowment
Conference Date: 18-20 July 2001 Conference Location: Fairfax, VA, USA
Language: English Document Type: Conference Paper (PA)
Treatment: Practical (P)
Abstract: The Earth System Science Workbench (ESSW) is a non-intrusive data management infrastructure for researchers who are also data publishers. An implementation of ESSW to track the processing of locally received satellite imagery is presented, demonstrating the Workbench's transparent and robust support for archiving and publishing data products. ESSW features a Lab Notebook **metadata** service, an ND-WORM (No Duplicate- **Write Once Read Many**) **storage** service, and Web user interface tools. The Lab Notebook logs processes (experiments) and their relationships via a custom API to XML documents stored in a relational **database** . The ND- **WORM** provides a managed **storage archive** for the Lab Notebook by keeping unique file digests and name-space **meta - data** , also in a relational database. ESSW Notebook tools allow project **searching** and ordering, and file and **meta - data** management. (15 Refs)
Subfile: A C

bad date

26/7/20 (Item 5 from file: 2)
DIALOG(R)File 2:INSPEC

5387947
Title: Electronic management of computer generated output
Author(s): Crame, J.
Journal: Document World no.5 p.28-9
Publisher: Int. Inf. Manag. Congress,
Publication Date: Sept.-Oct. 1996 Country of Publication: USA
CODEN: DOWOFI ISSN: 1025-9228
SICI: 1025-9228(199609/10)5L.28:EMCG;1-P
Material Identity Number: F154-96005
Language: English Document Type: Journal Paper (JP)
Treatment: Practical (P)
Abstract: Computerisation has resulted in more paper being generated, rather than the anticipated reduction. Paper (and/or microfiche) copies of

invoices, credit notes, customer statements, audit trails, ledgers and internal reports, to name just a few examples, appear everywhere. While paper and microfiche have taken huge storage and archiving burdens away from mainframe and mid-range processors in the past, users now face two major challenges. Firstly, increasing levels of legislation, regulation and tax and audit requirements, dictate that accurate computer-generated archives are maintained for even longer periods of time. Secondly, the competitive nature of today's business dictates that fast and accurate responses to **enquiries** are provided, ensuring the highest possible levels of customer service and employee productivity. To address these challenges, many users are now implementing computer output to laser disk (COLD) technology. COLD applications are specifically designed to run on industry standard PC platforms and to read the same formatted data which would otherwise have been written to microfiche or paper. The information is downloaded to a PC by a standard file transfer utility, automatically **indexed** with customer pre-defined **index** fields, compressed and stored onto optical disk **storage** and **archived** , typically to **write once read many** (WORM) optical media where it may remain online indefinitely. (0 Refs)
Subfile: D

26/7/23 (Item 8 from file: 2)
DIALOG(R)File 2:INSPEC

04064418
Title: Optical disk system tracks patient records at major army medical center
Author(s): Newby, W.
Author Affiliation: Brooke Army Med. Center, Fort Sam Houston, TX, USA
Journal: Remittance and Document Processing Today vol.14, no.3 p. 14-15
Publication Date: Sept.-Oct. 1991 Country of Publication: USA
CODEN: RDPTE6 ISSN: 0883-5594
Language: English Document Type: Journal Paper (JP)
Treatment: Practical (P)
Abstract: At Brooke Army Medical Center in Fort Sam Houston, Tex., doctors and researchers spend hours studying records of diseases and treatments that date back to 1947 to treat cancer successfully. While the films may be old, the filing technology is totally modern. Brooke Army Medical Center installed an optical disk-based records management system from Kodak to provide archival storage and meet the immediate **retrieval** needs of several departments. The Kodak system allows operators to quickly scan documents and **save** them on **WORM** (**write once** , **read many** times) optical disks. Operators **index** specified demographic data from the file to make **retrieval** fast and easy. (0 Refs)
Subfile: D

26/7/24 (Item 9 from file: 2)
DIALOG(R)File 2:INSPEC

03722908 INSPEC Abstract Number: C90065508
Title: The use of WORM **optical disc** storage **for newspaper cutting in a public library**
Author(s): Fulton, A.R.
Author Affiliation: Central Libr., Aberdeen, UK

Journal: Electronic Library vol.8, no.3 p.167-71
Publication Date: June 1990 Country of Publication: UK
CODEN: ELLIDZ ISSN: 0264-0473
Language: English Document Type: Journal Paper (JP)
Treatment: Practical (P)
Abstract: The Local History Department of the Central Library in Aberdeen has a collection of some 2300 volumes of locally produced newspapers and a press cuttings file with 101000 sheets of cuttings. The author describes the optical disc system chosen to help solve the problems of storage and access to this volume of material. The system chosen to help solve the problems of storage and access to this volume of material. The system chosen is a CACL system using Compaq PCs and bundled by Computerland. The system consists of a Microtek MSF-300C Image Scanner-a higher resolution (300*300 dots per inch) optical page scanner which converts text, photographs, etc., into binary code for processing by a Compaq Deskpro 286 Computer with a 40 Mb hard disk and 1.2 Mb diskette drive, and storing via an Intelligent Archive Optical Disc Drive on double-sided discs with a capacity of 120 Mb per side. A Hewlett Packard Laser Jet II provides print facilities. The system uses CATALYST Graphic Handling Software to scan, save, read and print and THE CORPORATE **RETRIEVER** free-text **retrieval** software to **index** and **retrieve** the images. (0 Refs)
Subfile: C

26/7/27 (Item 12 from file: 2)
DIALOG(R)File 2:INSPEC
(c) 2005 Institution of Electrical Engineers. All rts. reserv.

03244837 INSPEC Abstract Number: C88064230
Title: ZyINDEX Professional-full-featured text retrieval **program**
Author(s): Hughes, J.J.
Journal: Bits & Bytes Review vol.1, no.9 p.5-9
Publication Date: Aug. 1987 Country of Publication: USA
ISSN: 0891-2955
Language: English Document Type: Journal Paper (JP)
Treatment: Practical (P); Product Review (R)
Abstract: ZyINDEX is a 'semi-professional' class, menu-driven, stand-alone, MS-DOS text **retrieval** program that works with free-form and with field-delimited **indexed** text. It can **index** any ASCII file, as well as files created by over twenty-four popular word processors. It can **index** text that is stored on floppy and hard disks, as well as text that is **stored** on CD-ROMs and **WORMs** . (0 Refs)
Subfile: C

26/7/31 (Item 3 from file: 8)
DIALOG(R)File 8:Ei Compendex(R)
(c) 2005 Elsevier Eng. Info. Inc. All rts. reserv.

03487633 E.I. Monthly No: EIM9209-047036
Title: Factors affecting the performance of a DOS-based WORM file server.
Author: Hauser, Susan E.; Rivera, Christopher; Thoma, George R.
Conference Title: 11th IEEE Symposium on Mass Storage Systems
Conference Location: Monterey, CA, USA Conference Date: 19911007
Sponsor: IEEE Computer Soc
E.I. Conference No.: 16694
Source: Digest of Papers - IEEE Symposium on Mass Storage Systems. Publ by IEEE, IEEE Service Center, Piscataway, NJ, USA (IEEE cat n 92CH3039-5). p 33-37
Publication Year: 1992

CODEN: DPISDX ISBN: 0-8186-2155-9
Language: English
Document Type: PA; (Conference Paper) Treatment: T; (Theoretical); A; (Applications)
Journal Announcement: 9209
Abstract: An automated document delivery system is being developed and tested. This system integrates related but diverse technologies, including digital electronic scanners, local-area networks (LANs), telefacsimile, high-resolution displays, and digital optical disks. Digitized document images are **stored** on **write once read many** (**WORM**) optical disks and **retrieved** over a LAN for automatic delivery in response to user requests. Commercial software was selected to support archiving and **retrieving** document image files to and from WORM media over a LAN. As this software was integrated into the system, a performance study was initiated to determine the quantitative effect of several factors on the speed and reliability of image file transfer. These factors include network interface hardware, LAN organization, CPU clock speeds, remaining optical disk capacity, and the use of RAM by the WORM server for maintaining **index** files and for caching image files. It was found that WORM server CPU speed and the use of RAM for **index** files or for caching contributed the most to improved throughput. On the other hand, LAN organization and network interface hardware had little effect on throughput. 5 Refs.

26/7/45 (Item 2 from file: 95)
DIALOG(R)File 95:TEME-Technology & Management

01237712 E98081021232
Dokumentenformate entscheiden den Nutzen. Optische Archivierung
Fichtinger, S
Client Server Computing, v43, n9, pp35-36,38, 1998
Document type: journal article Language: German
Record type: Abstract
ISSN: 0947-5419

ABSTRACT:
Mit Hilfe der optischen Archivierung werden Papierdokumente in elektronische Dokumente umgewandelt, indem sie mit Hilfe eines Lasers auf einem optischen Medium (CD-ROM oder WORM) gespeichert werden. Die Recherchemoeglichkeiten koennen damit wesentlich verbessert werden. Im Vorfeld der Einfuehrung sollte eine tiefgruendige Beratung zur spezifischen Import- und Exportfaehigkeit von Dokumenten und Daten stattfinden. Besondere Bedeutung fuer die Zukunft haben die Faktoren Recherchefaehigkeit, Lesbarkeit sowie Dokumentenarten und Dokumentenformate. Das Faxformat TIFF hat sich zur Speicherung von Bildinformationen durchgesetzt. Die Recherchierbarkeit der Dokumente muss ueber Suchbegriffe oder logische Verknuepfungen moeglich sein. Dazu ist die Erfassung von **Indexinformationen** ein entscheidendes Kriterium. Die manuelle und die automatische **Indexierung** sind beschrieben. Das Dokumentenformat SGML ist ein herstellerunabhaengiger ISO-Standard, mit dem der Dokumentenaufbau (Struktur) definiert werden kann. Ausgaben fuer ein optisches Archiv amortisieren sich je nach Einsatzgebiet innerhalb von zwei bis vier Jahren.
? t26/7/46-48,55-62

26/7/46 (Item 3 from file: 95)
DIALOG(R)File 95:TEME-Technology & Management

01100845 E97050926246
Papier braucht Raum. Energieversorger setzt auf elektronisches Archiv
(Paper needs room. Electric-power utility company uses electronic archives)
anonym
ACS Systemberatung, D
NT und BackOffice Magazin, v1212, n6, pp43-46, 1997
Document type: journal article Language: German
Record type: Abstract
ISSN: 0948-678X

ABSTRACT:
Die Oder-Spree Energieversorgung AG in Frankfurt mit etwa 300000 Kunden und 360000 Stromzaehlern archiviert seit 1995 den gesamtem Schriftverkehr (Aufbewahrungsfrist: 6 Jahre) von etwa 300000 Seiten Non-Coded Information und eine Million Seiten Coded Information (Host-Output) in einem elektronischen Archiv, das folgende Anforderungen erfuellt: Archivierung mit Recherchefunktionen, frei gestaltbare Indizierung der Dokumente, moeglichst automatische Datenuebernahme, Computer Output on Laser Disk (COLD), Wiedervorlage und Fristueberwachung, Historienverwaltung, interne Mailfunktion, Workflow-Funktion. Grundlage des digitalen Archivs bildet das Dokumenten-Management-System 'Hyparchiv' der Firma ACS Systemberatung GmbH Hamburg unter dem Betriebssystem Windows NT. Fuer die Bearbeitung von Aussendienstauftraegen wurde ein Zusatzmodul entwickelt, das den E-Mail-Versand in das entsprechende Kundenzentrum realisiert. Zukuenftig ist die Installation von 'Hyparchiv' in den Abteilungen Finanzbuchhaltung (SAP R/2-Archivierung) und Kundenanschlusswesen (SAP R/3-Archivierung und Winword) vorgesehen.

26/7/47 (Item 4 from file: 95)
DIALOG(R)File 95:TEME-Technology & Management

01100840 E97050929246
Workflow ist gefragt. Elektronische Archive unterstuetzen das Dokumentenmanagement
(Workflow. Electronic archives support the document management)
anonym
Procad, D
NT und BackOffice Magazin, v1212, n6, pp52-55, 1997
Document type: journal article Language: German
Record type: Abstract
ISSN: 0948-678X

ABSTRACT:
Die Firma Procad GmbH Karlsruhe setzt seit 1995 das Engineering Data Management System 'Profile' unter Windows NT ein, um ein digitales Zeichnungsarchiv und Dokumentenarchiv zu realisieren. 'Profile' unterstuetzt die Klassifikation von Dokumenten sowie die Verbindung von mehreren Dokumenten des gleichen oder unterschiedlichen Typs, die mit CAD-Systemen, CAM-Systemen, Office-Applikationen, Viewing, PPS und Rasterbearbeitungssystemen erzeugt wurden. Fuer die Datenspeicherung werden 12-Zoll-WORMs oder CD-ROMs (zunehmend auch MODs) eingesetzt, bei einer Speicherkapazitaet von 650 MByte koennen 500 bis 1000 DIN A0-Zeichnungen im CCITT-Standard (Fax-Gruppe 4) archiviert werden. Die Aufbewahrung der Datentraeger erfolgt in Jukeboxsystemen mit Zugriff ueber Laderoboter. Die Vorteile des Archivierungssystems sind: Aufhebung von Medienbruechen, alle Dokumente liegen im gleichen Format vor; der Zugriff auf die Dokumente erfolgt am Arbeitsplatz des Sachbearbeiters, Kopieren und Transportieren von Dokumenten ist nicht mehr notwendig; der Dokumentenzugriff erfolgt in wenigen Sekunden und ist zeitlich unabhaengig; Dokumente koennen von

mehreren Sachbearbeitern gleichzeitig eingesehen werden; der Zugriff erfolgt immer auf das aktuelle Exemplar des Dokumentes; Dokumente koennen durch falsche Einsortierung nicht verloren gehen.

26/7/48 (Item 5 from file: 95)
DIALOG(R)File 95:TEME-Technology & Management

00744304 E93120173225
Renaissance des Mikrofilms. Wirtschaftliches Informationsmanagement durch Document Image Processing
Henrich, H
Computerwoche Extra, v106, n5, pp32-33, 1993
Document type: journal article Language: German
Record type: Abstract
ISSN: 0935-1310

ABSTRACT:
Die Firma Imnet Systems/Atlanta bietet eine mit einem Scanner versehene Jukebox, genannt Mega SAR, an. Das System kann mit Hilfe einer Punkte-Markierung einzelne Bilder eines Mikrofilms automatisch ansteuern. Waehrend das Verfilmen eines Dokumenten einschliesslich Qualitaetssicherung und **Indexierung** etwa 0,15 DM kosten, entstehen beim elektronischen Scannen zur Speicherung auf einer Bildplatte Kosten von 0,50 - 0,70 DM. Die Sozialkassen der Bauwirtschaft in Wiesbaden haben auf der Basis des Programms Entire Imaging (Software AG) ein Speicherungs- und **Retrieval** -System in Betrieb genommen, das Mikrofilmjukeboxen fuer 3 Mio Bilder und optische Jukeboxen beinhaltet. Auf einer WORM-Platte wurde ein temporaeres Korrespondenzarchiv eingerichtet.

26/7/55 (Item 1 from file: 256)
DIALOG(R)File 256:TecInfoSource

00147038 DOCUMENT TYPE: Review

PRODUCT NAMES: PERSIST AppStor (164623)

TITLE: Start-up Challenges EMC With E-mail Archiving Technology
AUTHOR: Mearian, Lucas
SOURCE: Computerworld, v37 n23 p10(1) Jun 9, 2003
ISSN: 0010-4841
HOMEPAGE: http://www.computerworld.com

RECORD TYPE: Review
REVIEW TYPE: Product Analysis
GRADE: Product Analysis, No Rating

PERSIST Technologies is a startup that developed PERSIST AppStor archiving and **search** software, which uses digital certificates and commodity blade servers to meet federal guidelines on retention of e-mail messages by financial services. Persist competes with EMC, the provider of the Centera fixed-disk data array, which uses software to generate a one-of-a-kind character **identifier** for each electronic document. Centera makes sure that information cannot be overwritten. Spokespeople for Persist say AppStor resides in front of e-mail servers and automatically assigns to each message a digital certificate that uses public-key infrastructure (PKI) technology. AppStor also operates with **WORM** (**write once** , **read**

many) **storage** devices and therefore complies with U.S. Securities and Exchange Commission (SEC) regulations that require financial service companies to archive all e-mail. The software also can archive electronic documents, images, and audio files. The U.S. Army purchased AppStor as an early user in August 2002 and installed the software on a group of six Hewlett-Packard (HP) blade servers. The software is used to manage an e-mail network for almost 200 users who generally do not delete messages. AppStor, says the spokesperson, has made it easier to **search** for and **retrieve** messages.

REVISION DATE: 20040430

26/7/56 (Item 2 from file: 256)
DIALOG(R)File 256:TecInfoSource

00122532 DOCUMENT TYPE: Review

PRODUCT NAMES: EASY SOFT 3.0 (793639)

TITLE: Doc-Enabling ERP Systems
AUTHOR: Henschen, Doug
SOURCE: Imaging & document solutions, v9 n1 p13(1) Jan 2000
ISSN: 1083-2912
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RECORD TYPE: Review
REVIEW TYPE: Review
GRADE: A

Easy Software's Easy Soft 3.0, a document-enabling enterprise resource planning (ERP) system, is a module-based system that provides just about all ERP platforms with a choice of capture, document management, and Web collaboration abilities. Rated excellent overall, Easy Soft 3.1 can be used either standalone or with ERP integration. Easy Software plans to compete with market leader IXos Software with aggressive pricing and certified links to SAP and Baan. Easy Soft's core Easy Archive server allows users to store documents and **retrieve** them with the assistance of as many as 999 **index** fields and full-text **searching** abilities from Verity. The user can offload and archive data to ensure excellent performance from the ERP system. In addition to supporting existing and planned ERP systems, Easy Archive also supports Lotus Notes and Staffware. Users can also integrate with other systems via the Easy Link open programming interface (API). Easy Archive provides many optional modules to allow the user to combine needed functions. Easy-COLD segments and **indexes** printer files and gets them ready for full-text **retrieval** , while Easy-Win COLD allows the user to print from any Windows application directly to the archive. Easy-Transfer allows users to move **archived** data from hard disk to **WORM** , MO, or CD-R. Easy Juke-box, and Easy-CDQuery support libraries and standalone CD-Rs respectively, and Easy-Online allows users to mirror archive data to hard disk for quicker access speeds.

REVISION DATE: 20040228

26/7/57 (Item 1 from file: 583)
DIALOG(R)File 583:Gale Group Globalbase(TM)

04936079
Xerox dans la gestion electronique de plans de grandes dimensions
  FRANCE - NEW ELECTRONIC PLAN MANAGEMENT SYSTEM FROM XEROX
Monde Informatique (LMI) 24 February 1992 p10
ISSN: 0242-5769
Language: French

Xerox Engineering Systems (XES), formerly Versatec and a subsidiary of Xerox, has introduced DocuPlex, an electronic document management system designed for handling plans up to A0 format. DocuPlex costs FFr1.5 mil for a basic configuration consisting of a scanner, two Sun SPARC workstations, a 12 in digital optical disk drive from Sun, an 8840 plotter and the necessary software, including the Oracle relational database. The 5 cm/sec A0 scanner and the 2.5 cm/sec 8840 laser plotter are both from Fuji Xerox. DocuPlex can be connected to an Ethernet network and allows plans up to A0 format to be captured, modified if required, **indexed** , **stored** on **WORM** digital optical disks or on Sony magneto-optical disks, **searched** for and printed. The first DocuPlex user in France was Framatome. XES expects to generate FFr20 mil from DocuPlex in 1992, by selling the system to integrators and services companies as well as to end-users.

26/7/58 (Item 2 from file: 583)
DIALOG(R)File 583:Gale Group Globalbase(TM)

04564239
Facit focus security features
  UK - FACIT INTRODUCES PC-BASED OPTICAL STORAGE
Office Equipment Index (OEI) 0 October 1991 p10
ISSN: 0305-635X

Facit Office Products has introduced a document storage system based on its Docubase software. The PC-based system has **storage** capacity on **WORM** optical disks of up to 40k scanned documents and 400k data files. ASCII text files, scanned documents, formatted files and other DOS files can all be stored on the system. **Retrieval** time is said to be 1 sec with a 386PC using six **keywords** .

26/7/59 (Item 3 from file: 583)
DIALOG(R)File 583:Gale Group Globalbase(TM)

03708628
NEW OPTICAL DISK-BASED DOCUMENT STORAGE SYSTEM
  UK - NEW OPTICAL DISK-BASED DOCUMENT STORAGE SYSTEM
What's New In Computing (WNC) 0 September 1990 p45

Facit Office Products has introduced a PC driven document storage and **retrieval** system which enables up to 40k scanned documents and 400k **data** files to be **stored** on a **WORM** optical disk. The system is based on Facit's Docubase software which accepts files in a variety of formats including DOS files. It also includes a user interface which complies to the IBM SAA standard. Data from other computer systems can be downloaded for archiving without user intervention, and on line help screens and full colour menus allow the system to be set up and used rapidly even by inexperienced operators. Each document, record, computer file or image is **indexed** with up to 39 **identifiers** and folders are used for grouping similar documents logically. The system offers four levels of user access.

26/7/60 (Item 4 from file: 583)
DIALOG(R)File 583:Gale Group Globalbase(TM)

03350163
GATEWAY, WELLCOME AND TELEVISION FIRMS USING WORM DISKS
UK - GATEWAY, WELLCOME AND TELEVISION FIRMS USING WORM DISKS
Business Systems & Equipment (BSE) 0 February 1990 p14,16
ISSN: 0007-7097

Gateway, foodmarkets chain, now receives most of its suppliers' invoices via EDI, but is legally required to store the information for 6 years. Data **storage** on a **WORM** system provided a payback period of 13-15 months, vs GBP30k-GBP40k capital costs for computer output to microfilm. Some 3.6 mil invoices are stored for GBP5k/y, maintenance is facilitated, and security is improved. The Wellcome Foundation, drugs manufacturer, uses microfilm to store the technical data from drugs testing, which does not often need **retrieval** , while **WORM** disks are employed for **storage** of, and easy access to, the vast correspondence and documentation associated with licence applications. Some TV regions are using an image storage and **retrieval** system, developed by Logica and using WORM disks, for libraries of still pictures, in preference to 35-mm slides. The picture are now safely stored, cross- **indexed** , and easily **retrieved** . Use of graphics on TV has also been assisted by **WORM storage** .

26/7/61 (Item 5 from file: 583)
DIALOG(R)File 583:Gale Group Globalbase(TM)

02832323
FORMSCAN LAUNCHES OPTICAL IMAGE STORAGE & PROCESSING
UK - FORMSCAN LAUNCHES OPTICAL IMAGE STORAGE & PROCESSING
Business Equipment Digest (BED) 0 June 1989 p9
ISSN: 0007-6708

Formscan UK has launched an optical disk-based image storage and processing system. The Start system scans a document, digitises and **indexes** its information, and then **stores** it on a **WORM** disk. The system then allows document **retrieval** and integration with existing files. Output, including graphics, is on a laser printer. The system can also make cross refernce/ **key word searches** .

26/7/62 (Item 6 from file: 583)
DIALOG(R)File 583:Gale Group Globalbase(TM)

01734329
SOUTHDATA SPEEDS **SEARCH** ON SUPERFILE BY A FACTOR OF 1000
UK - SOUTHDATA SPEEDS **SEARCH** ON SUPERFILE BY A FACTOR OF 1000
Information World Review (IWR) 0 February 1988 p2
ISSN: 0950-9879

Southdata has released a new version of Superfile, which is claimed to be 1000 times faster at **searching** than the previous release. The screen display is now unable to keep up. Superfile will be used on **WORM databases** , and has emerged from a project carried out for Dutch Ministry

of Welfare, Health and Culture. These databases will have a capacity of 1Gbytes, updated quarterly. Pilot sites are preparing to test the software, which has already been tested on a 80386-based microcomputer Winchester disc. Superfile is being tested by a publisher of large technical **indexes** . Contact: (01) 995 7587.

03708628
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UK - NEW OPTICAL DISK-BASED DOCUMENT STORAGE SYSTEM
What's New In Computing (WNC) 0 September 1990 p45

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PRODUCT: Optical Storage (3679OP);
EVENT: PRODUCTS, PROCESSES & SERVICES (30);
COUNTRY: United Kingdom (4UK); OECD Europe (415); NATO Countries (420);
South East Asia Treaty Organisation (913);
?

04564239
Facit focus security features
  UK - FACIT INTRODUCES PC-BASED OPTICAL STORAGE
Office Equipment Index (OEI) 0 October 1991 p10
ISSN: 0305-635X

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COMPANY: FACIT OFFICE PRODUCTS

PRODUCT: Document Image Management Systems (3573DM); Document Image Management Software (7372DM);
EVENT: NEW PRODUCT EXTENSION (33);
COUNTRY: United Kingdom (4UK); OECD Europe (415); NATO Countries (420);
South East Asia Treaty Organisation (913);
?

04936079
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COMPANY: XEROX ENGINEERING SYSTEMS

PRODUCT: Optical Storage (3679OP); Document Image Management Systems (3573DM);
EVENT: NEW PRODUCT EXTENSION (33);
COUNTRY: France (4FRA); Northern Europe (414); OECD Europe (415); European Economic Community Countries (419); NATO Countries (420); South East Asia Treaty Organisation (913);
?

02832323
FORMSCAN LAUNCHES OPTICAL IMAGE STORAGE & PROCESSING
UK - FORMSCAN LAUNCHES OPTICAL IMAGE STORAGE & PROCESSING
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PRODUCT: Image Document Workstations (3573IW); Optical Storage (3679OP);
EVENT: PRODUCTS, PROCESSES & SERVICES (30);
COUNTRY: United Kingdom (4UK); OECD Europe (415); NATO Countries (420);
South East Asia Treaty Organisation (913);

FACTORS AFFECTING THE PERFORMANCE OF A DOS-BASED WORM FILE SERVER

Susan E. Hauser, Christopher Rivera, George R. Thoma

National Library of Medicine
Bethesda, Maryland

ABSTRACT

The Lister Hill National Center for Biomedical Communications (LHNCBC), a research and development division of the National Library of Medicine, is currently developing and testing an automated document delivery system. This system integrates related but diverse technologies, including digital electronic scanners, local-area networks (LANs), telefacsimile, high-resolution displays, and digital optical disks. Digitized document images are stored on Write Once Read Many (WORM) optical disks and retrieved over a LAN for automatic delivery in response to user requests.

Commercial software was selected to support archiving and retrieving document image files to and from WORM media over a LAN. As this software was integrated into the system, a performance study was initiated to determine the quantitative effect of several factors on the speed and reliability of image file transfer. These factors include network interface hardware, LAN organization, CPU clock speeds, remaining optical disk capacity, and the use of RAM by the WORM server for maintaining index files and for caching image files.

This paper describes the performance tests and results, and discusses tradeoffs associated with certain factors, for example, the use of RAM disk for index files. It was found that WORM server CPU speed and the use of RAM for index files or for caching contributed the most to improved throughput. On the other hand, LAN organization and network interface hardware had little effect on throughput.

BACKGROUND

The LHNCBC has implemented WORM technology in testbed systems for several years [1,2]. Until recently, software to interface the WORM drives to various computers has been developed and integrated inhouse, resulting in efficient but specialized software. Off-the-shelf software to support access to WORM drives over a LAN became available during the design phase of a new system for automated document delivery. The tradeoffs between purchasing commercial software and continuing development of the inhouse software for the current project were evaluated. It was estimated that the inhouse software would realize greater throughput and slightly more efficient use of optical disk capacity. These advantages were offset by the greater data security, flexibility, compatibility, and ease of system integration afforded by

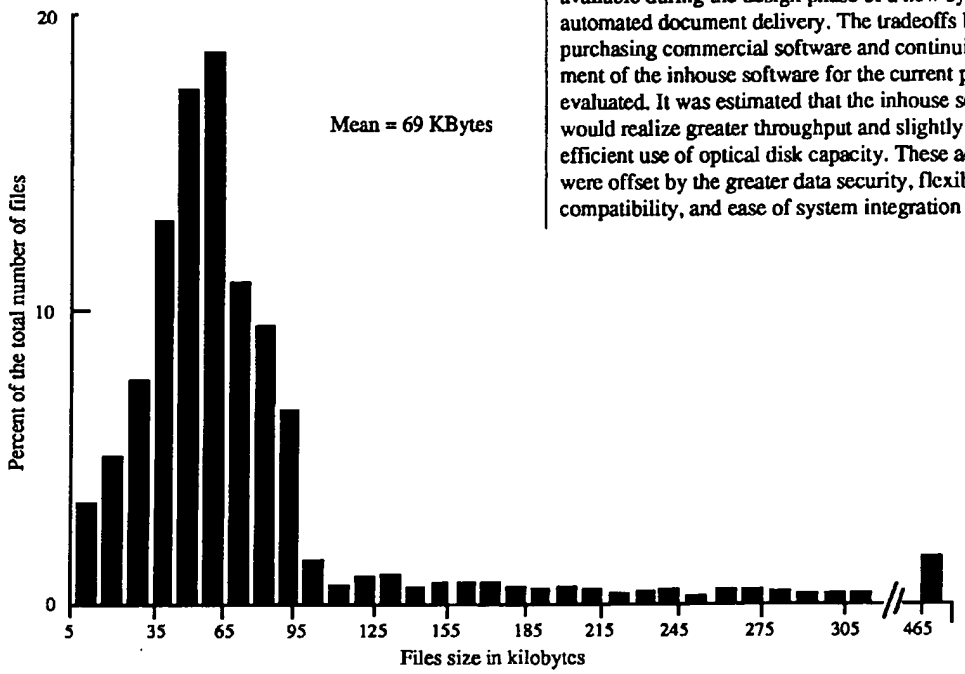


Figure 1. Page image file size distribution.

CH3039-5/91/0000/0033/$01.00 © 1991 IEEE

the commercial software. The commercial software was procured and, as it was being integrated into the system, a study began to measure the effect of certain hardware and software parameters on file transfer speed.

The files to be stored on and retrieved from the optical disks for this project are the compressed bit-mapped images of pages from biomedical documents. The images are captured at 200 pixels per inch and 1 bit per pixel. The distribution of file sizes is shown in Figure 1. The average file size is approximately 69 Kbytes. The 465-Kbyte files are uncompressed images.

THE TEST ENVIRONMENT

Figure 2 illustrates the LANs, servers, and workstations pertinent to this performance study. All computers are AT-type computers and all except the magnetic file server use the DOS 3.3 operating system. The magnetic file server runs Netware 2.15 Network Operating System. The WORM servers store and retrieve image files to and from platters mounted in the WORM drives in response to commands issued by other nodes on the LAN. Each WORM server is interfaced via SCSI to two Optimem 1000M optical disk drives. The off-the-shelf software performing the WORM server functions is WORMNET+, from Optical Software Solutions (OSS). This software employs IPX peer-to-peer communication to allow direct communication between the WORM server and other system computers.

The study used five file sizes: 10 KBytes, 35 KBytes, 63 KBytes, 100 KBytes, and 465 KBytes. The study measured the time required for five types of transfer: from local (workstation) magnetic disk to optical disk, from optical disk to local magnetic disk, from magnetic file server disk to optical disk, from optical disk to magnetic file server disk, and from one optical disk to another optical disk. For each hardware or software configuration of interest, the test program measured the total time interval for fifty transfers of each combination of file size and transfer type. The average file transfer time is one fiftieth of the total time measured. The sample size of fifty is computed on the basis of a 95% confidence interval with a tolerance of ± .04 second [3].

FACTORS AFFECTING TRANSFER TIME

For each configuration and transfer type, the average transfer time is a linear function of file size. Linear regression of each set of data points provides the value of the offset, representing a fixed overhead, and the slope, representing the additional time per KByte to transfer the file. The effect of hardware and software options on transfer time are determined by comparing the offset and slope for two configurations in which only one parameter is different.

The OSS software begins writing data files at the outermost track on the platter and proceeds inward. File access records begin at the innermost track and proceed outward [4]. Because the read/write head has farther to seek when the platter is empty than when it is full, it was of interest to determine how much this would affect read and write time. To determine the effect of remaining capacity, tests were run continuously on one platter until it was full. Linear regression analysis of transfer time as a function of remaining capacity reveals that remaining capacity has no effect on the time required to read files from the optical disk. The time to write files decreases slightly as the

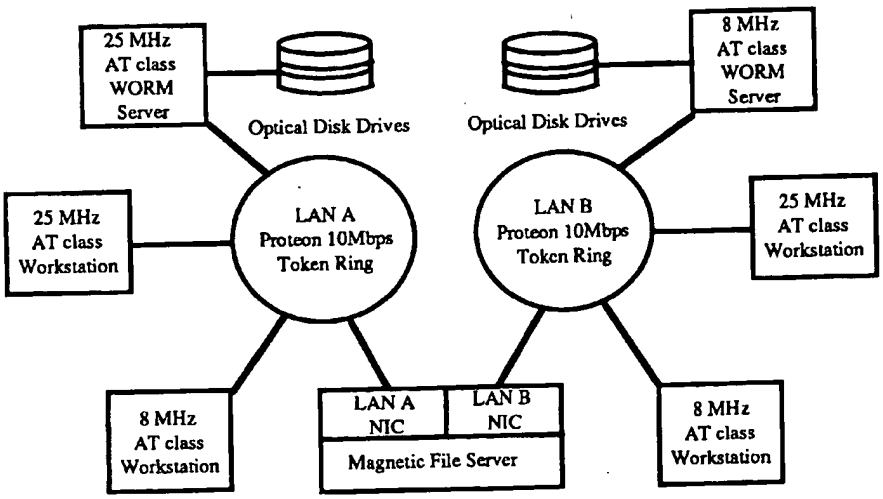


Figure 2. The components of the performance study.

platter fills up. This effect is taken into consideration when evaluating other test results. Whenever possible, data are compared from tests in which the remaining capacity is similar.

Workstation parameters

Two workstation platforms were used to evaluate the effect of workstation parameters on transfer times: an 8-MHz computer with an 80286 CPU and a 25-MHz computer with an 80386 CPU. For parameters of interest, transfer times are compared from each workstation between the two parameter choices. The WORM server configuration for these comparisons was an 8-MHz platform with a 16-bit Network Interface Card (NIC) and a RAM drive for the file access database files.

There are two types of Proteon NICs available for AT-type computers, with the primary difference being the width of the interface to the AT data bus [5]. Although the wider bus was found to decrease file transfer time between workstations and the magnetic file server by approximately 5 mseconds per KByte, it has little effect on the transfer time between workstations and the WORM file server. The 16-bit NIC only decreases the file transfer time from the local drive to the WORM platter by approximately 1 msecond per KByte, and has no effect on transfer time from the WORM platter to the local drive.

The effect of the internal bridge in the magnetic file server was determined by comparing transfer times between workstations on the same LAN as the WORM server and workstations on the other LAN. Moving files through the bridge took less than 2 mseconds per KByte for transfers from the WORM drive to a local drive, and had no effect on transfers from the local drive to the WORM drive.

The workstation parameter that has the greatest effect on transfer speed is the speed of the workstation itself. Figure 3 plots transfer times between the local drive and the WORM platter for the two types of workstations. Both computers were using the 16-bit NIC and were on the same LAN as the WORM server. The 25-MHz computer requires approximately 6 mseconds per KByte less time to transfer files to or from the WORM server.

WORM server parameters

The effect of adjustments to the WORM server configuration was measured by timing tests run from the two types of workstations described earlier. The 8-MHz computer was equipped with an 8-bit NIC and the 25-MHz computer with a 16-bit NIC. Both were connected to the same LAN as the WORM server. For all but one test, the platform for the WORM server is the 8-MHz computer.

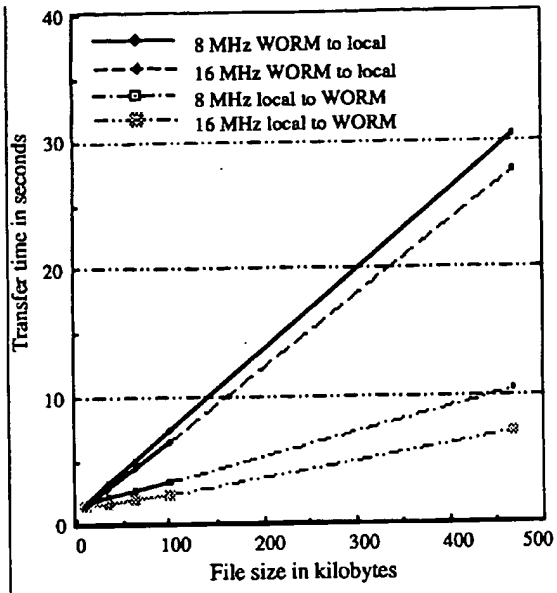
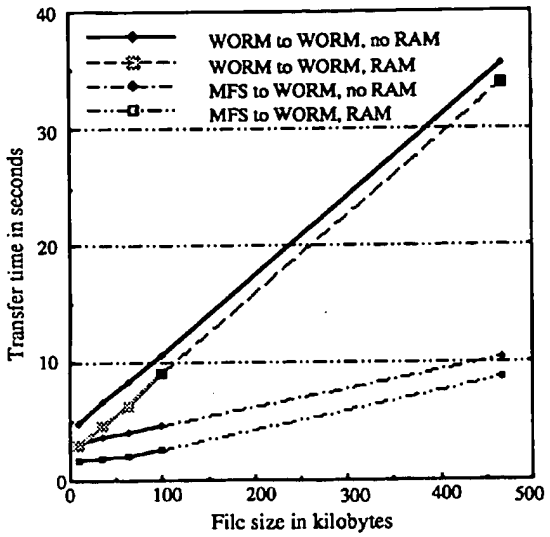


Figure 3. The effect of workstation CPU on transfer times between local and WORM drives.

Substituting a 16-bit NIC for an 8-bit NIC at the WORM server had the same small effect as it did in the workstations. The 16-bit NIC decreased transfer time to the WORM platter by approximately 2 mseconds per KByte and had no effect on transfer time from the WORM platter.

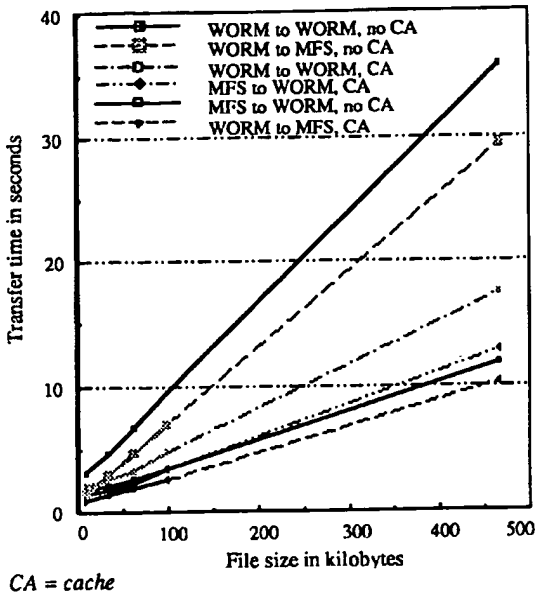
Using a 25-MHz computer as the platform for the WORM server, rather than an 8-MHz platform, had no effect on the rate at which files were transferred to and from the WORM platters. However, the 25-MHz platform was approximately 0.6 seconds per file faster for transfers from the magnetic file server to the WORM platter, and approximately 0.8 seconds faster for transfers from one WORM platter to another. This difference in overhead is primarily due to faster access to and update of the file access information. Platform speed had no effect on transfers from the WORM platter to the magnetic server.

The OSS software stores file access information in a set of database files. By default, these files are accessed and updated on the WORM server's magnetic drive. An option is to copy the files to a RAM drive before invoking the WORM server software and set an environment variable to instruct the software to access and update those files from the RAM drive. The use of the RAM drive speeds transfers to a WORM drive by approximately 2 seconds per file, as shown in Figure 4. The use of the RAM drive has no effect on transfers from a WORM drive, or on the rate of file transfer.



MFS = magnetic file server

Figure 4. The effect of RAM Drive at the WORM server as measured from a 25-MHz workstation.



CA = cache

Figure 5. The effect of caching at the WORM server as measured from a 25-MHz workstation.

As testing neared conclusion, a new version of WORMNET+ was received. Advertised highlights of the new version included two features to increase transfer speed. These were a redesigned file access database structure and the use of a RAM cache for WORM reads and writes. The actual increase in speed was measured by comparing transfer times between the new and old versions, with both systems using the RAM drive for file access database files. Figure 5 illustrates the differences as seen from a 25-MHz workstation. The data from an 8-MHz workstation are similar. The new features affect both the overhead (intercept) and data transfer rate (slope) of file transfer for reading and writing the optical disk. This is the only parameter measured in this study that affects the time required to transfer files from the WORM platter. The time required to read from a WORM platter, to either the magnetic file server or to another WORM platter, is decreased by approximately 40 mseconds per KByte. The overhead for WORM-to-WORM transfers is reduced by approximately 0.7 seconds per file and the overhead for WORM-to-magnetic file server transfers is decreased by approximately 0.3 seconds per file. The effect on transfers to the WORM platter is unexpected. The newer version of the software reduces the overhead time by approximately 0.3 seconds, but increases the data transfer time by approximately 3 mseconds per KByte. So for files greater than about 100 KBytes, the older version is more efficient than the new version. The details of the new features are proprietary, but it seems likely that the changes in overhead times result from the new database structure and the changes in data transfer rate results from the use of RAM caching. RAM caching has a profound effect on optical disk reads and a small effect on optical disk writes.

Since the new version of NETWARE+ was considerably faster than the previous version, one final test was made to determine if the greater speed reduced the effect of using or not using the RAM drive to store the file access database files. The use of the RAM drive reduces file transfers to the WORM drive by approximately 0.8 seconds per file, as compared to approximately 2 seconds per file using the older version of NETWARE+.

FACTORS AFFECTING RELIABILITY

There is some risk associated with the use of the RAM drive. The updated database files must be copied back to the magnetic drive when the WORM server is brought down. If the system should crash during operation, the updated files will be lost. They can be reconstructed from the file access data stored on the optical disks, which can be a time consuming process. Furthermore, these files grow to be very large. Even when files are deleted or entire platters are removed from the system, using a special OSS utility, the database files do not become smaller. Unless the application for which the WORM server is used expects to store a static and finite number of files on optical disks, the RAM drive will eventually be too small to hold all of the file access data. Although the use of a RAM drive considerably reduces the time required to write files to optical disks, it does not reduce the time required to read files from optical disks.

Several bugs and oversights were discovered in the OSS software during the performance tests and during development of application software for the automated document delivery system. These were cases where reliability could not be improved through adjusting hardware or software parameters, but only by programming "around" the bug with the application software. Our approach to dealing with these bugs is to correct the symptom at the lowest possible level in the program structure, preferably within library functions. This conceals the existence of the bug to the upper levels of the program structure. If the bug is later corrected, only the function needs to be modified.

Of particular note are cases when the Optimem drive failed to correctly write files to the WORM platter, but an error condition was not reported to the application software. One type of error is when the drive fails to notify the OSS software, and another type of error is when the drive notifies the OSS software, but the OSS software fails to notify the application software. The first type of error occurred five times in approximately 28,000 files and the second type occurred ten times in approximately 28,000 files. Although these frequencies are low, the consequences are potentially serious.

CONCLUSIONS

The fact that the transfer times from the WORM platter to either a local drive or to the magnetic server are independent of NIC and the bridge suggests that the read process at the WORM server is more of a bottleneck than either hardware component. However, the transfer time from the WORM platter to a local drive is noticeably slower for an 8-MHz workstation than for a 25-MHz workstation. Thus, in this case, the 8-MHz computer, or possibly its hard drive, is the bottleneck. The reason that the hard drive is a likely bottleneck is that rate of data transfer to and from an 8-MHz WORM server is about the same as to and from a 25-MHz WORM server, where the hard drive of the server is not involved.

Throughput is important to the automated document delivery application, both for archiving the images and for retrieving the images, especially since both of these functions will be simultaneously requesting service from the WORM server. However, reliability is even more important than speed, as much of the system is intended for unattended operation. Therefore, although the RAM-drive option of the WORM server does reduce the time required to read an image from the WORM platter, it will not be used in the operation of the automated document delivery system.

To handle the rare but serious cases in which files are not correctly archived to the WORM platters, the application program that archives these files has implemented two additional checks to the function that transfers a file to a WORM platter. After the file is written, the file size is compared to the size of the original file, and the file is opened and read. Although these checks reduce throughput, the overhead is necessary to ensure that document images are archived without errors.

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File 349:PCT FULLTEXT 1979-2002/UB=20050203,UT=20050127
         (c) 2005 WIPO/Univentio
File 324:German National Patents 1980-2005/Week 01
         (c) 2004 Univentio

Set     Items   Description
S1      32752   WORM OR WORMS OR WRITE()ONCE(1W)READ()MANY
S2        810   S1(5N)(MEMORY? OR MEMORIES OR STORAGE?)
S3       1294   S1(5N)(STORE OR STORES OR STORED OR STORING)
S4       2263   S1(5N)(ARCHIV? OR PRESTOR? OR WAREHOUS? OR HOUS??? ? OR CA-
             PTUR? OR RETAIN? OR COLLECT? OR PRESERV? OR ACCUMULAT? OR CUM-
             ULAT? OR AMASS?)
S5        115   S1(5N)(DEPOSIT? OR REPOSIT? OR SAVED OR SAVE? ? OR SAVING -
             OR DATABASE? OR DATASET? OR DATABANK? OR DATASTOR? OR DATAFIL-
             E? OR DATASYSTEM?)
S6          0   S1(5N)(DATACOLLECT? OR DATALIBRAR? OR DATAMART? OR STOREHO-
             US?)
S7         15   S1(5N)DATA()(BASE? ? OR SET? ? OR BANK? ? OR FILE? ? OR SY-
             STEM? ? OR LIBRAR? OR MART? ?)
S8    1708643   QUERY? OR QUERIE? ? OR SEARCH? OR SUBQUER? OR SUBSEARCH? OR
              RETRIEV? OR TEXTSEARCH? OR DATAMIN? OR IR OR HARVEST?
S9     498807   INQUIR? OR ENQUIR? OR FETCH? OR INTERROGAT? OR REQUISITION?
              OR EXTRACT?
S10     76297   MINE OR MINES OR MINED OR MINING
S11    300111   INDEX? OR INDICIE? ? OR INDICE? ? OR SUBINDEX? OR SUBINDIC-
             E? OR SUBINDICIE? ?
S12        44   S2:S7(10N)S8:S10
S13         0   S12(20N)S11
S14    484909   METAVALUE? OR METADATA? OR METATAG? ? OR TAG OR TAGS OR DE-
             SCRIPT?R? ? OR IDENTIFIER? OR CLASSIFY? OR CLASSIFIE? OR CLAS-
             SIFIC? OR TAXONOMY?
S15      2467   TAXONOMIE? OR TOPICTREE? OR META()(VALUE? ? OR DATA)
S16      9559   KEYFIELD? OR KEYDATA OR KEYWORD? OR KEYPHRASE? OR KEYTEXT?
             OR KEYTERM? OR KEYATTRIBUT? OR KEYPARAMET? OR KEYCRITER? OR K-
             EYCONCEPT? OR KEYTOPIC?
S17         4   KEYSUBJECT? OR KEYTHEME?
S18     20679   KEY()(FIELD? ? OR DATA OR WORD???? ? OR PHRASE? OR TEXT? ?
             OR TERM? ? OR TERMINOLOG? OR ATTRIBUTE? OR PARAMETER? OR CRIT-
             ERIA? OR CRITERION?)
S19       849   KEY()(CONCEPT? ? OR TOPIC? ? OR SUBJECT? ? OR THEME? ?)
S20         2   S12(20N)S14:S19
S21        42   S12 NOT S20
S22        42   IDPAT (sorted in duplicate/non-duplicate order)
S23        42   IDPAT (primary/non-duplicate records only)
S24       116   S1(10N)S11
S25         1   S24(20N)S14:S19
S26         1   S25 NOT S20:S21
S27      8862   S11(20N)S14:S19
S28         1   S27(20N)S1
S29         0   S28 NOT S26
?
```

? t20/5,k/2

20/5,K/2 (Item 1 from file: 324)
DIALOG(R)File 324:German National Patents

0002924268
Pattern comparison and storage device - selects images from memory according to entered data for comparison on=screen with image manipulation, e.g. using joystick
MUSTERVERGLEICHS- UND SPEICHEREINRICHTUNG
Patent Applicant/Assignee:
BUTENHOFF FRITZ DIPL ING, DE
Inventor(s):
BUTENHOFF FRITZ DIPL ING, DE
Patent and Priority Information (Country, Number, Date):
Patent: DE 4229720 A1 19930527
Application: DE 4229720 19920905
Priority Application: DE 4136375 19911105; DE 4229720 19920905 (DE 4136375; DE 4229720)
Main International Patent Class: G06K-009/32
International Patent Class: G06K-009/78
Main European Patent Class: G06K-007/10E
European Patent Class: G07C-009/00B6D2
Publication Language: German
Fulltext Availability:
Description (English machine translation)
Claims (English machine translation)
Description (German)
Claims (German)
Fulltext Word Count (English): 2595
Fulltext Word Count (German) : 2100
Fulltext Word Count (Both) : 4695

Abstract (English machine translation)
The pattern comparison and storage device contains geometric data and alphanumeric identifiers for each object stored in a computer (2). Object images are stored in an image memory (10), e.g. a high density, rapid access WORM plate, controlled by the computer.

Fulltext Availability:
Claims (English machine translation)

Claims (English machine translation)
... pictures of the object in by the computer headed for, actually bekann-ten bit map **memory** , for example on a **WORM** -plate with high **memory** density and fast access, digitally or similarly be stored, for **search** and comparison of the looked forgeometrical considering the **classification** pattern of the object together with of the data base program in actually well-known...
?

? t23/5,k/1,8-13,15-17

23/5,K/1 (Item 1 from file: 348)
DIALOG(R)File 348:EUROPEAN PATENTS

01836917
Instant messaging object store
Objektspeicher fur sofortige Nachrichtenubermittlung
Memoire d'objets pour messagerie instantanee
PATENT ASSIGNEE:
MICROSOFT CORPORATION, (749866), One Microsoft Way, Redmond, WA 98052, (US), (Applicant designated States: all)
INVENTOR:
Miller, David Michael, 16925 NE 42nd Street, Redmond, Washington 98052, (US)
Holmes, John, 17771 NE 90th Str., H#143, Redmond, Washington 98052, (US)
VonKoch, Walter, 2717 Western Avenue #5014, Seattle, Washington 98121, (US)
LEGAL REPRESENTATIVE:
Grunecker, Kinkeldey, Stockmair & Schwanhausser Anwaltssozietat (100721), Maximilianstrasse 58, 80538 Munchen, (DE)
PATENT (CC, No, Kind, Date): EP 1494411 A1 050105 (Basic)
APPLICATION (CC, No, Date): EP 2004102690 040614;
PRIORITY (CC, No, Date): US 611599 030701
DESIGNATED STATES: AT; BE; BG; CH; CY; CZ; DE; DK; EE; ES; FI; FR; GB; GR; HU; IE; IT; LI; LU; MC; NL; PL; PT; RO; SE; SI; SK; TR
EXTENDED DESIGNATED STATES: AL; HR; LT; LV; MK
INTERNATIONAL PATENT CLASS: H04L-012/58

ABSTRACT EP 1494411 A1
A method includes receiving a name associated with a user on a remote computer, the name including location data and a hash value uniquely associated with a data object representing the user and retrieving the data object from one of a local cache based on the hash value or a location identified by the location data. A system for managing obj ects representing users in an instant messaging conversation includes a data object representing a user, the data object having an object name including a location identifier and a hash value, the object name allowing, and an object store operable to retrieve the data object from a location identified by the location identifier and store the data object in a local cache based on the hash value.
ABSTRACT WORD COUNT: 128
NOTE:
Figure number on first page: 1

LEGAL STATUS (Type, Pub Date, Kind, Text):
Application: 050105 A1 Published application with search report
LANGUAGE (Publication,Procedural,Application): English; English; English
FULLTEXT AVAILABILITY:

Available Text	Language	Update	Word Count
CLAIMS A	(English)	200501	791
SPEC A	(English)	200501	5881
Total word count - document A			6672
Total word count - document B			0
Total word count - documents A + B			6672

...SPECIFICATION and devices are disclosed for managing objects in an instant messaging system. Generally, an object **store** provides a **write - once , read - many** object **storage** and **retrieval** system, wherein the objects are immutable. The object store provides an interface through

which a...

23/5,K/8 (Item 8 from file: 348)
DIALOG(R)File 348:EUROPEAN PATENTS

00569409
Optical disk with rewritable and write-once areas.
Optische Platte mit Wiederaufzeichnungsbereichen und einmalig beschreibbaren Bereichen.
Disque optique avec zones d'enregistrement reenregistrables et a ecriture unique.
PATENT ASSIGNEE:
International Business Machines Corporation, (200120), Old Orchard Road, Armonk, N.Y. 10504, (US), (applicant designated states: DE;FR;GB)
INVENTOR:
Baxter, Duane Willard, 2212 Fifth Avenue S.W., Rochester, MN 55902, (US)
Gregg, Leon Edward, 2411 24th Street N.W., Rochester, Minnesota 55901, (US)
Jaaskelainen, William, 610 West Center Street, Oronoco, Minnesota 55960, (US)
LEGAL REPRESENTATIVE:
Louet Feisser, Arnold et al (20624), Trenite Van Doorne European Patent Attorneys P.O. Box 75265, NL-1070 AG Amsterdam, (NL)
PATENT (CC, No, Kind, Date): EP 567170 A1 931027 (Basic)
APPLICATION (CC, No, Date): EP 93200847 930324;
PRIORITY (CC, No, Date): US 871436 920421
DESIGNATED STATES: DE; FR; GB
INTERNATIONAL PATENT CLASS: G11B-007/007; G11B-007/24;
CITED PATENTS (EP A): GB 2157035 A
CITED REFERENCES (EP A):
PATENT ABSTRACTS OF JAPAN vol. 16, no. 58 (P-1311)13 February 1992
PATENT ABSTRACTS OF JAPAN vol. 12, no. 194 (P-713)7 June 1988
PATENT ABSTRACTS OF JAPAN vol. 10, no. 147 (P-460)(2204) 29 May 1986
PATENT ABSTRACTS OF JAPAN vol. 8, no. 179 (P-295)17 August 1984
PATENT ABSTRACTS OF JAPAN vol. 7, no. 224 (P-227)5 October 1983
PATENT ABSTRACTS OF JAPAN vol. 12, no. 125 (P-691)19 April 1988;

ABSTRACT EP 567170 A1
An optical storage arrangement is provided where a unified optical disk (10), or other optical media, has separate Read/Write (R/W) (20) and Write Once Read Many (WORM) (15) areas. A Read/Write head or transducer selectively records data only once in the WORM area but records and re-records data in the R/W area. Both areas can be selectively read repetitively. The WORM area is used to store data records and the R/W area contains directories for the data records recorded in the WORM area. (see image in original document)
ABSTRACT WORD COUNT: 90
LEGAL STATUS (Type, Pub Date, Kind, Text):
Application: 931027 A1 Published application (A1with Search Report ;A2without Search Report)
Examination: 940302 A1 Date of filing of request for examination: 931227
Withdrawal: 970423 A1 Date on which the European patent application was deemed to be withdrawn: 961001
LANGUAGE (Publication,Procedural,Application): English; English; English
FULLTEXT AVAILABILITY:

Available Text	Language	Update	Word Count
CLAIMS A	(English)	EPABF1	282
SPEC A	(English)	EPABF1	2303

Total word count - document A 2585
Total word count - document B 0
Total word count - documents A + B 2585

...SPECIFICATION storing and retrieving archival data. Archival records are generally long term records and thus the **WORM storage** medium is ideal for such records. However, to **retrieve** records it is expeditious to use a directory. A file of records can be deleted...

23/5,K/9 (Item 9 from file: 348)
DIALOG(R)File 348:EUROPEAN PATENTS

00495558
Structured data storage method and medium.
Verfahren und Trager fur strukturierten Datenspeicher.
Methode et support de stockage structure de donnees.
PATENT ASSIGNEE:
International Business Machines Corporation, (200120), Old Orchard Road, Armonk, N.Y. 10504, (US), (applicant designated states: DE;ES;FR;GB;IT)
INVENTOR:
Gregg, Leon Edward, 2411 24th Street N.W., Rochester, Minnesota 55901, (US)
Rolfe, Randy Keith, 3955 18th Avenue N.W., Rochester, Minnesota 55901, (US)
LEGAL REPRESENTATIVE:
de Pena, Alain et al (15151), Compagnie IBM France Departement de Propriete Intellectuelle, F-06610 La Gaude, (FR)
PATENT (CC, No, Kind, Date): EP 472484 A2 920226 (Basic)
EP 472484 A3 940323
APPLICATION (CC, No, Date): EP 91480105 910711;
PRIORITY (CC, No, Date): US 570035 900820
DESIGNATED STATES: DE; ES; FR; GB; IT
INTERNATIONAL PATENT CLASS: G06F-003/06;
CITED PATENTS (EP A): US 4682318 A; US 4791623 A; EP 333165 A

ABSTRACT EP 472484 A2
A WORM data storage medium includes primary (100, 200, 300, ...) and secondary (101-104) data storage areas in which data and pointers to allocated but unwritten update areas are written. Original and updated data is written in a write sequence or chain of primary data areas separated by branched secondary data storage areas. The most recent updated data is found in a two level search of primary and then secondary data storage areas in order to save time by searching only those secondary areas where the most recent update exist. (see image in original document)
ABSTRACT WORD COUNT: 97

LEGAL STATUS (Type, Pub Date, Kind, Text):

Application:	920226	A2	Published application (A1with Search Report ;A2without Search Report)
Examination:	920812	A2	Date of filing of request for examination: 920619
Search Report:	940323	A3	Separate publication of the European or International search report
Change:	960124	A2	Representative (change)
Examination:	961113	A2	Date of despatch of first examination report: 960926
Withdrawal:	981021	A2	Date on which the European patent application was deemed to be withdrawn: 980602

LANGUAGE (Publication,Procedural,Application): English; English; English
FULLTEXT AVAILABILITY:

Available Text	Language	Update	Word Count
CLAIMS A	(English)	EPABF1	996
SPEC A	(English)	EPABF1	3655
Total word count - document A			4651
Total word count - document B			0
Total word count - documents A + B			4651

...SPECIFICATION a structure and method overcoming disadvantages of those used in the past.
In brief, a **WORM** data **storage** medium structured for fast **retrieval** of current data in accordance with the present invention includes a plurality of primary data...

...CLAIMS next sequential data storage area at the time that data is written in any data **storage** area.
7. A **WORM** data **storage** medium structured for fast **retrieval** of current data comprising:
a plurality of primary data storage areas defined in the storage...

23/5,K/10 (Item 10 from file: 348)
DIALOG(R)File 348:EUROPEAN PATENTS

00489901
Directory management system
Verzeichnisverwaltungssystem
Systeme de gestion de repertoire
PATENT ASSIGNEE:
CANON KABUSHIKI KAISHA, (542361), 30-2, 3-chome, Shimomaruko, Ohta-ku, Tokyo, (JP), (applicant designated states: DE;FR;GB;IT;NL)
INVENTOR:
Okuda, Osamu, c/o CANON K.K. (Kosugi-Jigyosho), 53, Imaikami-cho, Nakahara-ku, Kawasaki-shi, Kanagawa-ken, (JP)
LEGAL REPRESENTATIVE:
Beresford, Keith Denis Lewis et al (28273), BERESFORD & Co. 2-5 Warwick Court High Holborn, London WC1R 5DJ, (GB)
PATENT (CC, No, Kind, Date): EP 487331 A2 920527 (Basic)
EP 487331 A3 930113
EP 487331 B1 970528
APPLICATION (CC, No, Date): EP 91310706 911120;
PRIORITY (CC, No, Date): JP 90316480 901121
DESIGNATED STATES: DE; FR; GB; IT; NL
INTERNATIONAL PATENT CLASS: G06F-017/30; G11B-020/12; G11B-027/28;
CITED PATENTS (EP A): EP 260115 A; WO 8901663 A; US 4682318 A; EP 165382 A
CITED REFERENCES (EP A):
PROCEEDINGS OF THE INTERNATIONAL CONFERENCE ON DATA ENGINEERING 1984, SILVER SPRINGS, U.S.A. pages 175 - 180 P. RATHMANN 'Dynamic data structures on optical disks';

ABSTRACT EP 487331 A2
A directory management apparatus for managing data or a directory using directories, includes a data input unit for inputting data, an attribute information generating unit for generating attribute information indicating a directory to which the data input from the data input unit belongs or a directory to which the directory belongs, and a recording unit for recording the data input from the data input unit, and the attribute information generated by the attribute information generation unit on a recording medium. (see image in original document)

ABSTRACT WORD COUNT: 87

LEGAL STATUS (Type, Pub Date, Kind, Text):
 Application: 920527 A2 Published application (Alwith Search Report ;A2without Search Report)
 Search Report: 930113 A3 Separate publication of the European or International search report
 Examination: 930804 A2 Date of filing of request for examination: 930602
 Examination: 950816 A2 Date of despatch of first examination report: 950630
 Grant: 970528 B1 Granted patent
 Oppn None: 980520 B1 No opposition filed
LANGUAGE (Publication,Procedural,Application): English; English; English
FULLTEXT AVAILABILITY:

Available Text	Language	Update	Word Count
CLAIMS A	(English)	EPABF1	1054
CLAIMS B	(English)	EPAB97	445
CLAIMS B	(German)	EPAB97	404
CLAIMS B	(French)	EPAB97	480
SPEC A	(English)	EPABF1	3877
SPEC B	(English)	EPAB97	4053
Total word count - document A			4931
Total word count - document B			5382
Total word count - documents A + B			10313

...SPECIFICATION in which recorded data cannot be rewritten, a recording capacity can be saved, and a **search** time can be shortened.
As a **storage** medium, a **write once read many** optical disc may be employed. Although the invention is extremely advantageously employed to solve the...

...SPECIFICATION in which recorded data cannot be rewritten, a recording capacity can be saved, and a **search** time can be shortened.
As a **storage** medium, a **write once read many** optical disc may be employed. Although the invention is extremely advantageously employed to solve the...

23/5,K/11 (Item 11 from file: 348)
DIALOG(R)File 348:EUROPEAN PATENTS

00488624
Track crossing detector for optical disk
Spuruberkreuzungsdetektor fur optische Platte
Detecteur de traversee de piste pour disque optique
PATENT ASSIGNEE:
PIONEER ELECTRONIC CORPORATION, (537923), No. 4-1, Meguro 1-chome, Meguro-ku Tokyo-to, (JP), (applicant designated states: DE;FR;GB;NL)
INVENTOR:
Yamazaki, Seiichi, c/o Pioneer Electronic Corp., Tokorozawa Works, No. 2610 Hanazono 4-chome, Tokorozawa-shi, Saitama-ken, (JP)
LEGAL REPRESENTATIVE:
Brunner, Michael John et al (28871), GILL JENNINGS & EVERY Broadgate House 7 Eldon Street, London EC2M 7LH, (GB)
PATENT (CC, No, Kind, Date): EP 480761 A2 920415 (Basic)
EP 480761 A3 920708
EP 480761 B1 960529
APPLICATION (CC, No, Date): EP 91309398 911011;
PRIORITY (CC, No, Date): JP 90273731 901012

DESIGNATED STATES: DE; FR; GB; NL
INTERNATIONAL PATENT CLASS: G11B-007/085;
CITED PATENTS (EP A): EP 220039 A; EP 224935 A; GB 2062421 A
CITED REFERENCES (EP A):
PATENT ABSTRACTS OF JAPAN, vol. 13, no. 253 (P-883), 13th June 1989; & JP-A-1 052 228 (MATSUSHITA ELECTRIC IND. CO.) 28-02-1989
PATENT ABSTRACTS OF JAPAN, vol. 14, no. 253 (P-1054), 30th May 1990; & JP-A-2 066 735 (NEC CORP.) 06-03-1990
PATENT ABSTRACTS OF JAPAN, vol. 11, no. 248 (P-604), 13th August 1987; & JP-A-62 054 171 (NEC CORP.) 09-03-1987;

ABSTRACT EP 480761 A2
An information reading device for an optical disk has a peak level detector (1), a coupling capacitor (2), a comparator (4), and a resetting circuit (5, 6, 7, 8). The comparator (4) produces an on-track signal based on a detected peak signal from the peak level detector (1). Information tracks on the optical disk are searched based on a count of pulses of the on-track signal. The resetting circuit (5, 6, 7, 8) has a boundary detector (5, 6) and a switching circuit (7, 8). The boundary detector produces a boundary signal indicative of the boundary between recorded and unrecorded regions on the optical disk. In response to the boundary signal, the switching circuit (7, 8) discharges stored charges of the coupling capacitor (2) in the unrecorded region, causing detected peak signals in the recorded and unrecorded region to vary in amplitude across a common reference level. (see image in original document)
ABSTRACT WORD COUNT: 154

LEGAL STATUS (Type, Pub Date, Kind, Text):

Application:	920415	A2	Published application (A1with Search Report ;A2without Search Report)
Search Report:	920708	A3	Separate publication of the European or International search report
Examination:	921119	A2	Date of filing of request for examination: 920924
Examination:	950208	A2	Date of despatch of first examination report: 941221
Grant:	960529	B1	Granted patent
Oppn None:	970521	B1	No opposition filed
Lapse:	971015	B1	Date of lapse of the European patent in a Contracting State: GB 961011

LANGUAGE (Publication,Procedural,Application): English; English; English
FULLTEXT AVAILABILITY:

Available Text	Language	Update	Word Count
CLAIMS A	(English)	EPABF1	426
SPEC A	(English)	EPABF1	2718
Total word count - document A			3144
Total word count - document B			0
Total word count - documents A + B			3144

...SPECIFICATION track crossing detector for detecting a traversing or crossing motion across a track for tracking **searching** operation.
Description of the Prior Art:
Information **storage** optical disks include a **WORM** optical disks on which information can be recorded only once. Various mechanisms have been proposed...

23/5,K/12 (Item 12 from file: 348)
DIALOG(R)File 348:EUROPEAN PATENTS

00464166

Data processing by image manipulation.

Datenverarbeitung durch Bildmanipulation.

Traitement de donnees par manipulation d'images.

PATENT ASSIGNEE:
FROESSL, Horst, (317950), Gutenbergstrasse 2-4, W-6944 Hemsbach, (DE),
(applicant designated states: DE;FR;GB;IT;NL;SE)
INVENTOR:
FROESSL, Horst, Gutenbergstrasse 2-4, W-6944 Hemsbach, (DE)
LEGAL REPRESENTATIVE:
Frei, Alexandra Sarah (49784), Frei Patentanwaltsburo Hedwigsteig 6
Postfach 768, CH-8029 Zurich, (CH)

PATENT (CC, No, Kind, Date): EP 464467 A2 920108 (Basic)
EP 464467 A3 930113
APPLICATION (CC, No, Date): EP 91110032 910619;
PRIORITY (CC, No, Date): US 547190 900703
DESIGNATED STATES: DE; FR; GB; IT; NL; SE
INTERNATIONAL PATENT CLASS: G06F-015/40;
CITED PATENTS (EP A): EP 282997 A; DE 3523042 A; EP 304302 A
CITED REFERENCES (EP A):
ELECTRONIC DESIGN 15 March 1982, pages 49 - 54 W. HORAK 'Layering approach manages mixed documents'
PROC. SEAS ANNIV MEETING 1988 vol. 1611, 26 September 1988, AALBORG pages 1141 - 1152 D. LATTERMANN 'Blockschrift Heidelberg A simple method for creating raster pattern fonts from scanned character images'
IBM TECHNICAL DISCLOSURE BULLETIN vol. 6, no. 1, June 1963, NEW YORK US pages 111 - 112 J. REINES 'specimen identification device';

ABSTRACT EP 464467 A2

A method of manipulating information is disclosed in which the data is stored as a digitized image and is retained in image form for various data processing manipulations. A font table is formed having a matrix of fonts correlated with characters and symbols in code form such as ASCII. Desired material in the stored documents is located using pattern-match searching with a parallel processor search engine. (see image in original document)

ABSTRACT WORD COUNT: 73

LEGAL STATUS (Type, Pub Date, Kind, Text):

Application:	920108 A2	Published application (A1with Search Report ;A2without Search Report)
Search Report:	930113 A3	Separate publication of the European or International search report
Examination:	930721 A2	Date of filing of request for examination: 930521
Change:	960410 A2	Representative (change)
Withdrawal:	960626 A2	Date on which the European patent application was deemed to be withdrawn: 960103

LANGUAGE (Publication,Procedural,Application): English; English; English
FULLTEXT AVAILABILITY:

Available Text	Language	Update	Word Count
CLAIMS A	(English)	EPABF1	589
SPEC A	(English)	EPABF1	4118
Total word count - document A			4707
Total word count - document B			0
Total word count - documents A + B			4707

...SPECIFICATION be copied into RAM or disk for sorting or other manipulation. Alternatively, the contents of **storage** such as optical disk (**WORM**) can be copied to RAM for pattern match **searching** .

It is also possible to automatically provide a string of all fonts for

each search...

23/5,K/13 (Item 13 from file: 348)
DIALOG(R)File 348:EUROPEAN PATENTS

00463080
Mass document storage and retrieval system.
Massenspeicher- und Wiederauffindungssystem fur Dokumente.
Memoire de masse et systeme de recouvrement pour des documents.
PATENT ASSIGNEE:
Froesel, Horst, (1374080), Gutenbergstrasse 2-4, W-6944 Hemsbach, (DE),
(applicant designated states: DE;FR;GB;IT;NL;SE)
INVENTOR:
Froesel, Horst, Gutenbergstrasse 2-4, W-6944 Hemsbach, (DE)
LEGAL REPRESENTATIVE:
Frei, Alexandra Sarah (49784), Frei Patentanwaltsburo Hedwigsteig 6
Postfach 768, CH-8029 Zurich, (CH)
PATENT (CC, No, Kind, Date): EP 465818 A2 920115 (Basic)
EP 465818 A3 930107
APPLICATION (CC, No, Date): EP 91108916 910531;
PRIORITY (CC, No, Date): US 536769 900612
DESIGNATED STATES: DE; FR; GB; IT; NL; SE
INTERNATIONAL PATENT CLASS: G06F-015/403;
CITED PATENTS (EP A): EP 170469 A; EP 251237 A; WO 8404864 A; EP 202671 A;
US 4610025 A
ABSTRACT EP 465818 A2
A sequence of documents is delivered to an optical scanner in which each document is scanned to form a digital image representation of the content of the document. In one embodiment, the image representation is converted into code (ASCII) and is automatically examined by data processing apparatus to select search words which meet predetermined criteria and by which the document can subsequently located. In another embodiment, the image is not converted. The search words are stored in a non-volatile memory in code form and the entire document content is stored in mass storage, either in code or image form. Techniques for selecting the search words are disclosed.
ABSTRACT WORD COUNT: 109

LEGAL STATUS (Type, Pub Date, Kind, Text):

Application:	920115 A2	Published application (A1with Search Report ;A2without Search Report)
Change:	920212 A2	Representative (change)
Search Report:	930107 A3	Separate publication of the European or International search report
Examination:	930707 A2	Date of filing of request for examination: 930513
Change:	960410 A2	Representative (change)
Withdrawal:	960605 A2	Date on which the European patent application was deemed to be withdrawn: 951201

LANGUAGE (Publication,Procedural,Application): English; English; English
FULLTEXT AVAILABILITY:

Available Text	Language	Update	Word Count
CLAIMS A	(English)	EPABF1	1733
SPEC A	(English)	EPABF1	7096
Total word count - document A			8829
Total word count - document B			0
Total word count - documents A + B			8829

...SPECIFICATION are stored and correlated with the ID number, 96, and the

converted image data are **stored** in **WORM** or other mass **store** . As before, the ID and **search** word information is stored in a non-volatile, rewritable form of memory such as a...

23/5,K/15 (Item 15 from file: 348)
DIALOG(R)File 348:EUROPEAN PATENTS

00385427
Method and apparatus for merging a digitized image with an alphanumeric character string.
Verfahren und Anordnung zum Mischen eines digitalisierten Bildes und einer alphanumerischen Zeichenfolge.
Procede et dispositif pour combiner une image numerisee avec une suite de caracteres alphanumeriques.
PATENT ASSIGNEE:
International Business Machines Corporation, (200120), Old Orchard Road, Armonk, N.Y. 10504, (US), (applicant designated states: DE;FR;GB)
INVENTOR:
Parks, Carol A., 4994 Tall Oaks Drive, Monrovia Maryland 21770, (US)
Probst, Robert E., 11326 French Horn Lane, Reston Virginia 22091, (US)
Rajagopal, Doraiswamy, 4804 Sweetbirch Drive, Rockville Maryland 20853, (US)
Youngs, Gary L., 11408 Flints Grove Lane, Gaithersburg Maryland 20878, (US)
LEGAL REPRESENTATIVE:
Jost, Ottokarl, Dipl.-Ing. (6092), IBM Deutschland GmbH Patentwesen und Urheberrecht Schonaicher Strasse 220, D-7030 Boblingen, (DE)
PATENT (CC, No, Kind, Date): EP 388579 A2 900926 (Basic)
EP 388579 A3 911030
APPLICATION (CC, No, Date): EP 90100182 900105;
PRIORITY (CC, No, Date): US 326338 890321
DESIGNATED STATES: DE; FR; GB
INTERNATIONAL PATENT CLASS: G06F-015/20; G06F-015/72;
CITED PATENTS (EP A): EP 146714 A; GB 2198566 A; EP 127745 A
CITED REFERENCES (EP A):
IBM TECHNICAL DISCLOSURE BULLETIN vol. 26, no. 10A, March 1984, page 5164, Armank, New York, US; Y. T. CHAN et al.: "Creation of forms in word processing display systems";

ABSTRACT EP 388579 A2
A method is disclosed for merging an alphanumeric data stream with a digitized image file. It comprises the steps of inputting a digitized image file in a first input terminal and storing the digitized image file on a first storage medium. The method then inputs an alphanumeric character string in a second input mechanism and stores the alphanumeric character string in a second storage medium. The method then converts the alphanumeric character string stored in the second storage medium into a bit pel image of the alphanumeric character string by substituting a two dimensional bit pattern of pels for each respective character in the string. The method then performs a logical combination of the bit pattern for each respective alphanumeric character with the digitized image at respective intended character locations in the digitized image area and outputs the logically combined digitized image with the alphanumeric character string superimposed thereon.
ABSTRACT WORD COUNT: 153

LEGAL STATUS (Type, Pub Date, Kind, Text):
Application: 900926 A2 Published application (Alwith Search Report

;A2without Search Report)
Examination: 910206 A2 Date of filing of request for examination: 901213
Change: 911016 A2 International patent classification (change)
Change: 911016 A2 Obligatory supplementary classification (change)
Search Report: 911030 A3 Separate publication of the European or International search report
Examination: 950222 A2 Date of despatch of first examination report: 950110
Withdrawal: 961218 A2 Date on which the European patent application was deemed to be withdrawn: 960523
LANGUAGE (Publication,Procedural,Application): English; English; English
FULLTEXT AVAILABILITY:

Available Text	Language	Update	Word Count
CLAIMS A	(English)	EPABF1	796
SPEC A	(English)	EPABF1	5658
Total word count - document A			6454
Total word count - document B			0
Total word count - documents A + B			6454

...SPECIFICATION processing combination of the two, each stored in its own format, in a single, secure (**WORM** technology) folder **storage** and **retrieval** system. Nor did previous art provide automatic merger capability of the two formats in the...

23/5,K/16 (Item 16 from file: 348)
DIALOG(R)File 348:EUROPEAN PATENTS

00380120
Solid state microscope.
Halbleiter Mikroskop.
Microscope semi-conducteur.
PATENT ASSIGNEE:
XILLIX TECHNOLOGIES CORPORATION, (1501210), Suite 200, 2339 Columbia Street, Vancouver, British Columbia, V5Y 3Y3, (CA), (applicant designated states: AT;BE;CH;DE;ES;FR;GB;GR;IT;LI;LU;NL;SE)
INVENTOR:
Jaggi, Bruno, 2861 West 3rd Avenue, Vancouver, British Columbia, V6K 1M8, (CA)
Deen, Mohamed J., 2861 West 3rd Avenue, Vancouver, British Columbia, V6K 1M8, (CA)
Palcic, Branko, 2861 West 3rd Avenue, Vancouver, British Columbia, V6K 1M8, (CA)
LEGAL REPRESENTATIVE:
Ferkinghoff, Claes-Goran et al (22791), Awapatent AB Sodra Hamngatan 37-41 P.O. Box 11394, S-404 28 Goteborg, (SE)
PATENT (CC, No, Kind, Date): EP 380904 A1 900808 (Basic)
EP 380904 B1 940504
APPLICATION (CC, No, Date): EP 89850028 890201;
PRIORITY (CC, No, Date): EP 89850028 890201
DESIGNATED STATES: AT; BE; CH; DE; ES; FR; GB; GR; IT; LI; LU; NL; SE
INTERNATIONAL PATENT CLASS: G02B-021/00;
CITED PATENTS (EP A): US 4549204 A; EP 265067 A; US 4700298 A; US 4398211 A

ABSTRACT EP 380904 A1
A quantitative light microscope for viewing and scanning microscopic objects that uses a solid state detector (7) in the primary image plane. The microscope has a light source (1) with a condensor (2) and diffusion

filter (3). A moveable stage (5) is provided to allow X, Y, Z plane displacements in order to scan objects under the microscope. There is an objective (6) to magnify the image of the object and project this image onto a two dimensional solid state image sensor (7) positioned in the primary image plane of the objective. The solid state image sensor (7) sends signals to an analog-to-digital converter (8) where the signals are digitized and sent to a frame memory (9). A monitor (10) is used to display the image of the object as stored in frame memory. The present invention can be interfaced with a computer (12) to allow for automatic focusing and scanning of an image. The computer also houses storage means to store images. Methods of scanning an object are also described. A prism element can be used to obtain spectral scans of an object. In another scanning method, a first edge row of pixels is used to detect an object of interest in the scanned image. This first detection row activates an area of the sensor array at a later time to capture the entire image. In this way, only relevant information is collected and processed.

ABSTRACT WORD COUNT: 240

LEGAL STATUS (Type, Pub Date, Kind, Text):

Lapse:	020605	B1	Date of lapse of European Patent in a contracting state (Country, date): AT 19940504, BE 19940504, CH 19940504, LI 19940504, FR 19940930, GR 19940504, IT 19940504, NL 19940504, SE 19940504,
Lapse:	20000126	B1	Date of lapse of European Patent in a contracting state (Country, date): AT 19940504, BE 19940504, CH 19940504, LI 19940504, FR 19940930, GR 19940504, IT 19940504, NL 19940504,
Lapse:	020612	B1	Date of lapse of European Patent in a contracting state (Country, date): AT 19940504, BE 19940504, CH 19940504, LI 19940504, ES 19940504, FR 19940930, GR 19940504, IT 19940504, NL 19940504, SE 19940504,
Application:	900808	A1	Published application (A1with Search Report ;A2without Search Report)
Examination:	910130	A1	Date of filing of request for examination: 901201
Change:	920805	A1	Representative (change)
*Assignee:	920805	A1	Applicant (transfer of rights) (change): XILLIX TECHNOLOGIES CORPORATION (1501210) Suite 200, 2339 Columbia Street Vancouver, British Columbia, V5Y 3Y3 (CA) (applicant designated states: AT;BE;CH;DE;ES;FR;GB;GR;IT;LI;LU;NL;SE)
Examination:	921216	A1	Date of despatch of first examination report: 921105
Grant:	940504	B1	Granted patent
Lapse:	941130	B1	Date of lapse of the European patent in a Contracting State: CH 940504, LI 940504
Lapse:	941130	B1	Date of lapse of the European patent in a Contracting State: CH 940504, LI 940504
Lapse:	950111	B1	Date of lapse of the European patent in a Contracting State: AT 940504, CH 940504, LI 940504
Lapse:	950222	B1	Date of lapse of the European patent in a Contracting State: AT 940504, CH 940504, LI 940504, FR 940930
Lapse:	950315	B1	Date of lapse of the European patent in a Contracting State: AT 940504, BE 940504, CH

940504, LI 940504, FR 940930

Lapse:	950322 B1	Date of lapse of the European patent in a Contracting State: AT 940504, BE 940504, CH 940504, LI 940504, FR 940930, NL 940504
Oppn None:	950426 B1	No opposition filed
Lapse:	991020 B1	Date of lapse of European Patent in a contracting state (Country, date): AT 19940504, BE 19940504, CH 19940504, LI 19940504, FR 19940930, IT 19940504, NL 19940504,

LANGUAGE (Publication,Procedural,Application): English; English; English
FULLTEXT AVAILABILITY:

Available Text	Language	Update	Word Count
CLAIMS B	(English)	EPABF1	774
SPEC B	(English)	EPABF1	4866
Total word count - document A			0
Total word count - document B			5640
Total word count - documents A + B			5640

...SPECIFICATION required. A variety of mass storage devices are commercially available, the most appropriate being optical **memory** disk recorders or **WORM** (**Write Once Read Many**) recorders due to their large **memory** capacity and non-destructive way of **retrieving** information.

Focusing of the solid state microscope can be achieved automatically under computer control by...

23/5,K/17 (Item 17 from file: 348)
DIALOG(R)File 348:EUROPEAN PATENTS

00370742
Disc recording apparatus.
Plattenaufzeichnungsgerat.
Appareil pour l'enregistrement de disques.
PATENT ASSIGNEE:
SONY CORPORATION, (214021), 7-35 Kitashinagawa 6-chome Shinagawa-ku, Tokyo 141, (JP), (applicant designated states: DE;FR;GB)
INVENTOR:
Tsurushima, Katsuaki, c/o Sony Corporation 7-35 Kitashinagawa 6-chome, Shinagawa-ku Tokyo, (JP)
LEGAL REPRESENTATIVE:
Ayers, Martyn Lewis Stanley et al (42851), J.A. KEMP & CO. 14 South Square Gray's Inn, London, WC1R 5EU, (GB)
PATENT (CC, No, Kind, Date): EP 365306 A1 900425 (Basic)
EP 365306 B1 940105
APPLICATION (CC, No, Date): EP 89310718 891018;
PRIORITY (CC, No, Date): JP 88265182 881020
DESIGNATED STATES: DE; FR; GB
INTERNATIONAL PATENT CLASS: G11B-019/04; G11B-019/16; G11B-021/08; G11B-027/034; G11B-027/28;
CITED PATENTS (EP A): EP 273421 A; DE 3734638 A; EP 259666 A; EP 164061 A

ABSTRACT EP 365306 A1
The present invention relates to a recording method and a recording apparatus for use with a disc having a data area in which data has been recorded and an area for recording control information (ie, table of contents information) for accessing a head to the data area. The recording apparatus comprises means for inhibiting the fetching of a disc if the control information has not been recorded in a predetermined area of the disc. Further, by providing a memory for storing the control

information, the invention permits the accessing of a head to the data area in accordance with the content of the memory. Thus, information recorded on the disc before the control information is recorded onto a predetermined area on the disc can be reproduced.

ABSTRACT WORD COUNT: 130

LEGAL STATUS (Type, Pub Date, Kind, Text):

Application:	900425	A1	Published application (A1with Search Report ;A2without Search Report)
Examination:	901128	A1	Date of filing of request for examination: 901004
Examination:	930512	A1	Date of despatch of first examination report: 930326
Grant:	940105	B1	Granted patent
Oppn None:	941228	B1	No opposition filed

LANGUAGE (Publication,Procedural,Application): English; English; English

FULLTEXT AVAILABILITY:

Available Text	Language	Update	Word Count
CLAIMS B	(English)	EPBBF1	534
CLAIMS B	(German)	EPBBF1	448
CLAIMS B	(French)	EPBBF1	610
SPEC B	(English)	EPBBF1	2742
Total word count - document A			0
Total word count - document B			4334
Total word count - documents A + B			4334

...SPECIFICATION want to try to reproduce the data before the WORM type compact disc 1 is **fetched** from the recording apparatus. In this case, the TOC data **stored** in the **memory** 27 is referenced and the optical pickup 14 is moved to a desired position in response to the TOC data **stored** in the **memory** 27.

In **the** above embodiment, control is made in a manner such as to write the TOC data...

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File 347:JAPIO Nov 1976-2004/Sep(Updated 050204)
         (c) 2005 JPO & JAPIO
File 350:Derwent WPIX 1963-2005/UD,UM &UP=200508
         (c) 2005  Thomson Derwent

Set     Items   Description
S1      30172   WORM OR WORMS OR WRITE()ONCE(1W)READ()MANY
S2        170   S1(5N)(MEMORY? OR MEMORIES OR STORAGE?)
S3        104   S1(5N)(STORE OR STORES OR STORED OR STORING)
S4       1506   S1(5N)(ARCHIV? OR PRESTOR? OR WAREHOUS? OR HOUS??? ? OR CA-
             PTUR? OR RETAIN? OR COLLECT? OR PRESERV? OR ACCUMULAT? OR CUM-
             ULAT? OR AMASS?)
S5         69   S1(5N)(DEPOSIT? OR REPOSIT? OR SAVED OR SAVE? ? OR SAVING -
             OR DATABASE? OR DATASET? OR DATABANK? OR DATASTOR? OR DATAFIL-
             E? OR DATASYSTEM?)
S6          2   S1(5N)(DATACOLLECT? OR DATALIBRAR? OR DATAMART? OR STOREHO-
             US?)
S7          6   S1(5N)DATA()(BASE? ? OR SET? ? OR BANK? ? OR FILE? ? OR SY-
             STEM? ? OR LIBRAR? OR MART? ?)
S8     308793   QUERY? OR QUERIE? ? OR SEARCH? OR SUBQUER? OR SUBSEARCH? OR
              RETRIEV? OR TEXTSEARCH? OR DATAMIN? OR IR OR HARVEST?
S9     559516   INQUIR? OR ENQUIR? OR FETCH? OR INTERROGAT? OR REQUISITION?
              OR EXTRACT?
S10     65780   MINE OR MINES OR MINED OR MINING
S11    198114   INDEX? OR INDICIE? ? OR INDICE? ? OR SUBINDEX? OR SUBINDIC-
             E? OR SUBINDICIE? ?
S12    148415   METAVALUE? OR METADATA? OR METATAG? ? OR TAG OR TAGS OR DE-
             SCRIPT?R? ? OR IDENTIFIER? OR CLASSIFY? OR CLASSIFIE? OR CLAS-
             SIFIC? OR TAXONOMY?
S13      1208   TAXONOMIE? OR TOPICTREE? OR META()(VALUE? ? OR DATA)
S14      8325   KEYFIELD? OR KEYDATA OR KEYWORD? OR KEYPHRASE? OR KEYTEXT?
             OR KEYTERM? OR KEYATTRIBUT? OR KEYPARAMET? OR KEYCRITER? OR K-
             EYCONCEPT? OR KEYTOPIC?
S15      6080   KEY()(FIELD? ? OR DATA OR WORD???? ? OR PHRASE? OR TEXT? ?
             OR TERM? ? OR TERMINOLOG? OR ATTRIBUTE? OR PARAMETER? OR CRIT-
             ERIA? OR CRITERION?)
S16        41   KEY()(CONCEPT? ? OR TOPIC? ? OR SUBJECT? ? OR THEME? ?) OR
             KEYSUBJECT? OR KEYTHEME?
S17       109   S2:S7 AND S8:S10
S18         2   S17 AND S11
S19         2   S17 AND S12:S16
S20       389   S1 AND S11
S21         2   S20 AND S12:S16
S22         6   S18:S19 OR S21
S23         6   IDPAT (sorted in duplicate/non-duplicate order)
S24         6   IDPAT (primary/non-duplicate records only)
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24/9/2 (Item 2 from file: 350)

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DIALOG(R)File 350:Derwent WPIX
(c) 2005  Thomson Derwent. All rts. reserv.

014540510    **Image available**
WPI Acc No: 2002-361213/200239
Related WPI Acc No: 2002-327699
XRPX Acc No: N02-282264
```

Read/write drive operation method for serial data storage system, involves referencing write append limiter identifying specific location on data storage medium, before which data is not permitted to be altered

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Patent Assignee: BASHAM R B (BASH-I); JESIONOWSKI L G (JESI-I); INT
  BUSINESS MACHINES CORP (IBMC  )
Inventor: BASHAM R B; JESIONOWSKI L G
```

Number of Countries: 001 Number of Patents: 002
Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week	
US 20020035665	A1	20020321	US 2000482985	A	20000111	200239	B
			US 2001978117	A	20011015		
US 6779080	B2	20040817	US 2000482985	A	20000111	200454	
			US 2001978117	A	20011015		

Priority Applications (No Type Date): US 2001978117 A 20011015; US 2000482985 A 20000111
Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
US 20020035665	A1		18	G06F-012/00	CIP of application US 2000482985
US 6779080	B2			G06F-012/00	CIP of application US 2000482985
					CIP of patent US 6339810

Abstract (Basic): US 20020035665 A1

NOVELTY - A write append limiter sequentially identifying a location on the data storage medium is referenced, before which data is not permitted to be altered. If a target write location occurs before the append limiter, an error message is generated, else the write data is stored at the write location. The limiter is advanced if the write data exceeds a write allowance **index** .

DETAILED DESCRIPTION - INDEPENDENT CLAIMS are also included for the following:

(a) Signal bearing medium;

(b) Logic circuit;

(c) Data storage library

USE - For operating read/write drive for conducting read/write operations on data storage media such as tape cartridge so as to render the media as **WORM** media.

ADVANTAGE - Protects user data from loss by treating data as read-only after the data is initially stored. Write append operations are facilitated by permitting limited overwriting of trailing **metadata** .

DESCRIPTION OF DRAWING(S) - The figure shows the flowchart illustrating a sequence for processing write and write append requests to implement **WORM** storage.

pp; 18 DwgNo 4/8

Title Terms: READ; WRITING; DRIVE; OPERATE; METHOD; SERIAL; DATA; STORAGE; SYSTEM; REFERENCE; WRITING; APPENDAGE; LIMIT; IDENTIFY; SPECIFIC; LOCATE; DATA; STORAGE; MEDIUM; DATA; PERMIT; ALTER
Derwent Class: T01; T03
International Patent Class (Main): G06F-012/00
File Segment: EPI
Manual Codes (EPI/S-X): T01-H01B1; T03-A07A1B; T03-A08E; T03-J01C

24/9/3 (Item 3 from file: 350)
DIALOG(R)File 350:Derwent WPIX

014506996 **Image available**
WPI Acc No: 2002-327699/200236
Related WPI Acc No: 2002-361213
XRPX Acc No: N02-256984

Read-write drive operating method for data storage sub-system, involves judging position of target write location with respect to write append limiter based on which error message is output and write append limiter is advanced

Patent Assignee: INT BUSINESS MACHINES CORP (IBMC)
Inventor: BASHAM R B; JESIONOWSKI L G
Number of Countries: 001 Number of Patents: 001
Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week	
US 6339810	B1	20020115	US 2000482985	A	20000111	200236	B

Priority Applications (No Type Date): US 2000482985 A 20000111
Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
US 6339810	B1		14	G06F-012/00	

Abstract (Basic): US 6339810 B1

NOVELTY - The write append limiter is referenced sequentially, to identify a write location, on data storage medium based on the received write request. When a target write location occurs before write append limiter, an error message is generated. The write data is stored when write location exists after the limiter. When the write data end exceeds the write append limiter by more than write allowance **index** , the limiter is advanced.

DETAILED DESCRIPTION - INDEPENDENT CLAIMS are also included for the following:

(a) Signal storage medium storing instruction for executing read/write drive;

(b) Logic circuit configured to perform operations of read/write drive;

(c) Data storage library

USE - For data storage sub-system using **write once read many** (**WORM**) devices used with computer.

ADVANTAGE - Protects user data from loss, by treating the data as read only after initial storage. Facilitates write append operations, by permitting limited overwriting of trailing **meta data** .

DESCRIPTION OF DRAWING(S) - The figure shows a flowchart describing process sequence of write/append limiter.

pp; 14 DwgNo 5/8

Title Terms: READ; WRITING; DRIVE; OPERATE; METHOD; DATA; STORAGE; SUB; SYSTEM; JUDGEMENT; POSITION; TARGET; WRITING; LOCATE; RESPECT; WRITING; APPENDAGE; LIMIT; BASED; ERROR; MESSAGE; OUTPUT; WRITING; APPENDAGE; LIMIT; ADVANCE
Derwent Class: T01; T03; U21
International Patent Class (Main): G06F-012/00
File Segment: EPI
Manual Codes (EPI/S-X): T01-C01; T01-H01B1; T03-F02; T03-P; U21-C
?

File 347:JAPIO Nov 1976-2004/Sep(Updated 050204)
(c) 2005 JPO & JAPIO
File 350:Derwent WPIX 1963-2005/UD,UM &UP=200508
(c) 2005 Thomson Derwent
File 348:EUROPEAN PATENTS 1978-2005/Jan W05
(c) 2005 European Patent Office
File 349:PCT FULLTEXT 1979-2002/UB=20050203,UT=20050
(c) 2005 WIPO/Univentio
File 324:German National Patents 1980-2005/Week 01
(c) 2004 Univentio

Applicants

Set	Items	Description
S1	1247	AU=SEKINE H?
S2	23	AU=HITOSHI S?
S3	459	AU=OTA J?
S4	11	AU=JUNICHI O?
S5	1740	S1:S4
S6	62924	WORM OR WORMS OR WRITE()ONCE(1W)READ()MANY
S7	6	S5 AND S6

7/6/1 (Item 1 from file: 347)
08028172 **Image available**
MOTOR

7/6/2 (Item 2 from file: 347)
08002014 **Image available**
SEAT SLIDE DEVICE FOR VEHICLE

7/6/3 (Item 3 from file: 347)
06030453 **Image available**
SMALL-SIZED MOTOR

7/6/4 (Item 4 from file: 347)
03631766 **Image available**
INCH **WORM** MECHANISM USING SHAPE MEMORY ALLOY

7/6/5 (Item 5 from file: 347)
02908529 **Image available**
DAMPER OF **WORM** GEAR DECELERATING MECHANISM

7/TI/6 (Item 1 from file: 350)
DIALOG(R)File 350:(c) 2005 Thomson Derwent. All rts. reserv.

Appts. for manipulating keys for nuclear fuel assemblies - includes mechanism for positioning keys adjacent to spacer grid and key and withdrawal mechanism associated with mechanism for rotating inserted keys
?

00578259 91-52606

Storing Data on Optical Disk Drives

Anonymous

Bank Systems & Technology v28n10 PP: 64, 66 Oct 1991 CODEN: BSEQD6
ISSN: 1045-9472 JRNL CODE: BSE
DOC TYPE: Journal article LANGUAGE: English LENGTH: 2 Pages
WORD COUNT: 1597
COMPANY NAMES:
San Diego First Bank
NCR Corp (DUNS:00-131-6090 TICKER:NCR)
IBM Corp (DUNS:00-136-8083 TICKER:IBM)
GigaTrend Inc
Iomega Corp (DUNS:02-153-7865 TICKER:IOMG)
GEOGRAPHIC NAMES: US

DESCRIPTORS: Information storage; Optical disk; Manycompanies; Manyproducts ; Advantages; Banks
CLASSIFICATION CODES: 5230 (CN=Computer hardware); 9190 (CN=United States); 8120 (CN=Retail banking)

ABSTRACT: Since it opened for business on May 15, 1991, San Diego First Bank has devised a means of producing reports that closely involves its data center outsourcer, NCR Corp., and an optical disk drive storage subsystem. The bank uses Cecorp's Cedata optical disk software to reconfigure and then store data in an optical disk drive. Along with its usual fall mainframe and midrange processor announcements, IBM Corp. introduced a series of direct access storage device (DASD) systems for its ES/9000 and 3090 mainframes and 4 new optical disk systems for its mainframes and AS/400 minicomputers. Other new products discussed include GigaTrend Inc.'s MasterDat digital audio tape (DAT) drive, Iomega Corp.'s Bernoulli 90, and Compaq Computer Corp.'s Intelligent Array Expansion System.

TEXT: When it opened for business on May 15 of this year, San Diego First Bank had $5 million capital, but it needed a reliable system for storing and printing its officers' reports. Since then, the bank's size has grown to $11 million in assets, and it has also come up with a means for producing reports that closely involves its data center outsourcer, NCR Corp., and an optical-disk drive storage subsystem.

NCR's Dallas center does the processing each night for San Diego First. At the end of each night's run, NCR downloads the results to an IBM Corp. Model 65SX in the bank's office. From there, the bank uses Cecorp's Cedata optical-disk software to reconfigure the data and store it an optical-disk drive. From that disk, the menu-driven package is used to run the bank's reports each day. The reports can be printed out on a laser printer connected to the Model 65, which also serves as the bank's network file server.

"We've stored every day's business since we opened on that drive, and we expect to get another two or three months use out of it," said Kimberly Surber, avp and operations administrator for the bank, which serves a community of Asian-American immigrants. Since the system has files from the bank's first day of business, Surber said she can print out reports from that far back if she needs them. In addition to retrieving data for reports, Cedata can be used to gather information for customer

correspondence, including such touch areas as missed payments and non-sufficient funds.

"Before we got the optical disk drive, we were doing the entire process on floppies," said Surber. But even in that set up, the bank's employees were using the same software. "If something every happened to the optical drive, we'd have the floppies as a back-up option."

Along with the information that comes from the data center every night, the teller balances for the bank's general ledger file are also stored on the optical drive. The five teller PCs each have floppies as their primary storage devices. Those disks are purged every month, and while the bark's records do not require a record of each transaction, the balances must be stored. In addition to the systems at the teller windows, the bank has another 13 PCs, including six which are at the desks of the platform officers.

The Cedata package operates as part of Cecorp's Cebas branch automation system. The software can be used to deliver data from four archives: current, on-line, optical disk and hard disk to any node on a local area network. It also allows users to retrieve files in part or in their entirety. The package relies on dBase file structures so that industry-standard applications can retrieve data with it without going through data-conversion tables.

IBM's DASD, Optical Systems

Along with its usual fall mainframe and mid-range processor announcements, IBM Corp. rolled out a series of direct access storage device (DASD) systems for its FS/9000 and 3090 mainframes and four new optical-disk systems for its mainframes and AS/400 minicomputers. The largest of the systems is the 3390 Model 3, which has 180 gigabytes of disk space in its base configuration. A second DASD, the 9340 subsystem, comes in two configfations, one that has from 2 gigabytes to 24 gigabytes of storage, and a second that has 4 gigabytes to 48 gigabytes. The optical storage systems consist of additions to the 3995 Dataserver series. The models 022 and 122 are write-once, read-many (WORM) systems that can be used in Token-Ring LANs, and the models 131 and 111 are rewritable disk systems for processors running IBM's MVS/ESA operating system.

DAT Drive Runs on NetWare

GigaTrend Inc.'s MasterDat digital audio tape drive performs network back-ups of a LAN's file servers at 35Mb per minute. The drive can be connected to a node instead of the server, and it distributes back-ups from all of the network's nodes. Any user on a network can back up files to a shared drive. By using a node as a dedicated archiving device, MasterDat frees the server to perform its primary functions, running the network. Since the drive can also perform duplex back-up and restore over T1 phone lines, it can also be used in an enterprise-wide computing environment. In addition, multiple network nodes can back up files to the drive simultaneously.

For High-Performance Workstations

Iomega Corp.'s Bernoulli line now includes a 90Mb drive with an access time of 19 ms, the Bernoulli 90. With caching software supplied by the company, the effective access time can be reduced to around 13 ms. The system is also equipped with a 32Kb cache memory, and has a data transfer rate of 20Mbits per second. Dual SCSI-II ports allow other peripherals to be daisy chained to the Bernoulli 90. The drive comes in four configurations: two

that can be installed in a microcomputer, a transportable unit with AC power, and a fourth that has dual drives.

Rewritable Optical Drive

A 650Mb optical-disk drive with a 1Mb per second data transfer rate was introduced by Ricoh Corp. Called the HyperSpace, the 5.25-inch drive can be used for storing documents, and it supports the ISO standard for storage systems. Its port is compatible with both the SCSI-I and SCSI-II standards. The drive's average access time is 37 milliseconds, and according to the manufacturer it can be best used as an on-line back-up to a hard disk in network applications. In addition, the drive features synchronous data transfers, which allows users to bypass the "handshaking" necessary for asynchronous data transfers.

Expandable System for LANs

Compaq Computer Corp.'s Intelligent Array Expansion System can be used to expand the storage of the company's Systempro server to 20 gigabytes. In its base configuration, the model 2600, the Array has 2.6 gigabytes of mass storage, and the component that makes its expansion possible is a 32-bit controller. The system has user-selectable fault-tolerant features such as drive mirroring and an on-line spare drive. With drive mirroring, the controller mirrors one drive to another, providing a back-up copy of every file. The system also has controller duplexing, which means that there are two controllers, each with its own set of drives. Each of these sets contains identical data to assure uninterrupted operation in the event of either a drive or controller failure.

Optical Storage Software

Microbank Software Inc.'s Stor/Trans and Stor/Fiche turnkey systems can be used in microcomputer systems to retrieve transaction records and report records from (WORM) drives. The software handles data archiving through downloading, converting and indexing, compression and file copying functions. Once the data has been stored on an optical drive, users can retrieve the data and share it via operating systems such as Novell Inc.'s NetWare, IBM Corp.'s OS/2 or Digital Equipment Corp.'s Pathworks. Stor/Trans indexes raw transactional data using variable search criteria. Stor/Fiche takes the same micrographic report output produced for fiche servicing and converts it into optically stored data for network access through Microsoft Corp.'s Windows interface.

Data Retrieval Software

CD Author HyperText and CD Answer HyperText software from Dataware Technologies, Inc., are designed to be used for paperless electronic publishing. The packages are intended to be used with files stored on CDROMs. CD Author is a development package that can be used with most desktop-publishing systems. Systems developers can use the package to describe document markup so that text can be entered and organized automatically. CD Answer is a retrieval package that is based on indexing and retrieval commands. The package uses FAX compressed graphics to integrate images into text files. It can run on 286-based IBM-compatible computers with 512K bytes of memory.

Rewritable Optical Disk

Verbatim Corp. introduced a rewritable optical disk with a footprint of 3.5 inches. With a capacity of 128Mb, the disk has been engineered to withstand more than 1 million write/erase/read cycles. The company also released a

122Mb O-ROM, (Optical Read Only Memory) disk. Both disks support the ISO standard and are designed to support the optical drive storage systems IBM Corp. introduced this summer. The rewritable disk can be used in document management applications, while the read-only disk is designed for software distribution, databases and reference works.

600Mb of Tape Back-Up

TEAC America, Inc. expanded its Turb-oTape tape back-up series to include the March 14, a 600Mb drive, a unit that comes in both ISA and Micro Channel versions. For Micro Channel systems that require 160Mb of storage or less, the company also introduced the Mach 7 PS/2. The various versions of the tape drive all come with a data cassette, host adapter card, cables and user manuals. They also come in both 3.5-inch and 5.25-inch formats. The drives can store 600Mb of uncompressed data in 43 minutes. Up to 1.2 gigabytes of data can be stored in compressed mode, but at a much slower rate of performance. The drives' operating software allows files that are on-line during back up to be automatically reported and queued for a retry at the end of the back-up session.
Tape Back-Up for PCs

A Digital Audio Tape external subsystem from Legacy Storage Systems, Inc. can be used with personal computers from IBM Corp., Compaq Computer Corp. and Apple Computer Inc. Called the Legacy 2200d, the unit uses the industry-standard Small Computer Systems Interface. It offers 2Gb of storage, and has a data-transfer rate of 11Mb per minute. Files can be accessed at an average speed of 45 seconds. The company said the tape is compatible with operating systems like Novell Inc.'s NetWare, Unix and OS/2 and can be used in LAN environments for unattended back-ups.

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US006823398B1

(12) **United States Patent**
Lee et al.

(10) **Patent No.: US 6,823,398 B1**
(45) **Date of Patent: Nov. 23, 2004**

(54) **FILE SYSTEM MANAGEMENT EMBEDDED IN A STORAGE DEVICE**

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(73) Assignee: **DPHI Acquisitions, Inc.**, Boulder, CO (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **09/539,841**

(22) Filed: **Mar. 31, 2000**

(51) **Int. Cl.**[7] **G06F 3/00**

(52) **U.S. Cl.** **710/5**; 710/68; 710/74; 710/105; 707/100; 707/101; 711/111; 711/112

(58) **Field of Search** 707/10, 200, 100–104.1; 710/260, 5, 68, 74, 105; 711/111–114

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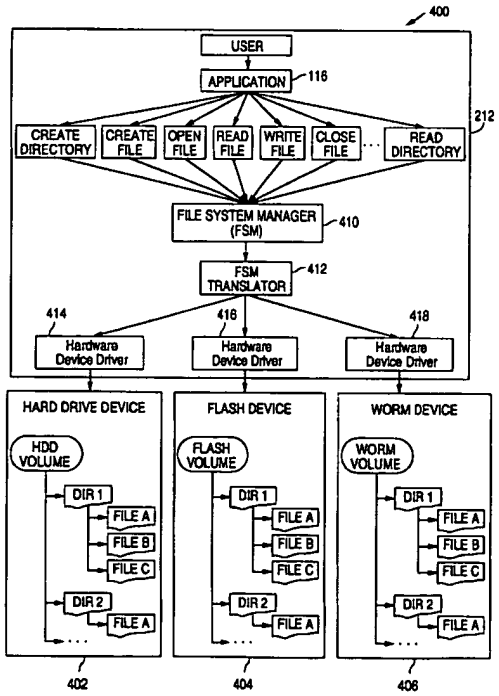
(57) **ABSTRACT**

A file system for accessing information on digital storage media is provided by a storage device controller embedded within the storage device. The storage device controller includes an interface component to receive a packet having a file system command. A command decode component in the storage device controller decodes the file system command, and an interface response structure component creates a strategy for performing the file system command. The storage device controller generates an identifier for a file system object and accesses the file system object using the file system object's identifier. A host system coupled to the storage device receives a storage device access request from an application program and generates a command to perform on the file system object based on the storage device access request. The host system uses the identifier to indicate the file system object to be accessed.

36 Claims, 4 Drawing Sheets



US006801902B1

(12) **United States Patent**
David

(10) **Patent No.: US 6,801,902 B1**
(45) **Date of Patent: Oct. 5, 2004**

(54) **METHOD AND SYSTEM FOR MANAGING DOCUMENTS IN A SYSTEM USING AT LEAST ONE DATABASE**

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(73) Assignee: **winrechte GbmH**, Bremen (DE)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **09/554,043**

(22) PCT Filed: **Nov. 10, 1997**

(86) PCT No.: **PCT/EP97/06228**

§ 371 (c)(1),
(2), (4) Date: **May 9, 2000**

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PCT Pub. Date: **May 5, 1999**

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(52) **U.S. Cl.** **707/1**; 707/205
(58) **Field of Search** 707/1–3, 205

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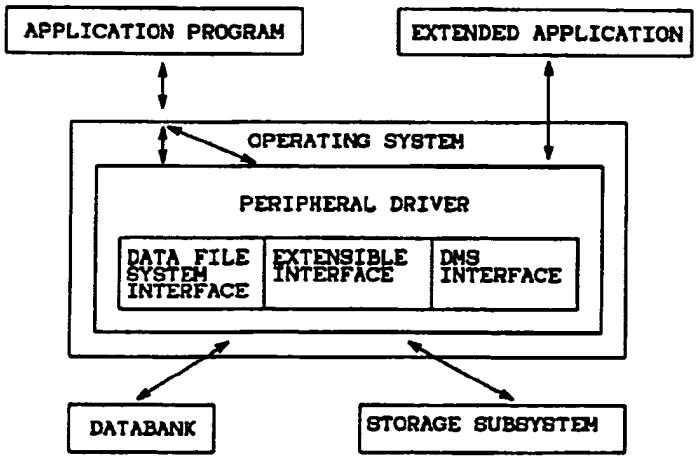
(57) **ABSTRACT**

A method for managing documents in a system comprising at least one electronic data processing installation for processing data by means of at least one data bank. A peripheral driver for electronic data processing installations which allows implementation of such a method. One aim is for simplifying and optimizing document management in electronic data processing systems by means of a data bank. For this purpose, document management is handled by a peripheral driver which is specific to the operating system and connected to the data bank. A improved embodiment of the invention, a data file system is provided for document management and the documents are managed by means of extended index features. The contents, of these extended index features is generated automatically or entered manually.

9 Claims, 6 Drawing Sheets



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(54) Optical disk with rewritable and write-once areas.

(57) An optical storage arrangement is provided where a unified optical disk (10), or other optical media, has separate Read/Write (R/W) (20) and Write Once Read Many (WORM) (15) areas. A Read/Write head or transducer selectively records data only once in the WORM area but records and re-records data in the R/W area. Both areas can be selectively read repetitively. The WORM area is used to store data records and the R/W area contains directories for the data records recorded in the WORM area.

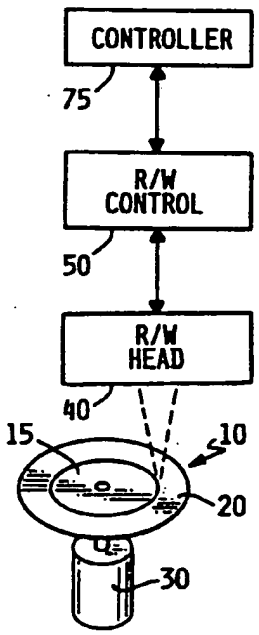

FIG. 3

EP 0 567 170 A1

This invention relates to optical media such as optical disks and more particularly to such optical media for containing recorded data.

The recorded data can be digital in form and can be utilized in any system requiring storage of data but is particularly useful in computer systems.

Optical Media for storing data are well known in the art. Typically, the optical media are of the type where data is record ed by modulation of a laser light beam to produce predictable variations in the reflective characteristics of the media and these variations can then be detected and decoded during a read phase. The optical media are generally known a s Write Once Read Many or WORM media. It is an excellent media for records having a relatively long life span such as archival records. No records are erased and a version by version record can be kept. The records are on tracks and normally it is necessary to search all the tracks in order to read out desired data. In order to reduce the time required to read out the desired data, it was common to use a directory where directory records are relatively small compared to the associated data records. Even so, directory processing consumes or requires a large amount of programming support. This is true even where the directory area is made separate from the data record area as shown in European Patent Application number 89114885.0 filed 11.08.89 for Optical Card. This is because the directory can not be re-written.

U.S. Patent 4, 575,827 addresses this problem and notes that while one could employ a record medium having an optical portion and a magnetic portion respectively, for storing data and directories, such an arrangement greatly increases the cost of the data recorder, and hence, is not desirable. The present invention does not mix optical and magnetic portions on a unified record medium and therefore does not encounter the cost problems inherent in such an arrangement. The present invention does, however, improve directory management and reduces the overall time required to retrieve archival records.

In accordance with the present invention, the optical record medium has a Read/Write (R/W) portion and a Write Once Read Many (WORM) portion. The R/W portion is reserved for directories and the WORM portion is dedicated to data records. A single Read/Write (R/W) head employing conventional laser writing and magneto optical reading techniques is used for both WORM and R/W areas. The single R/W head is operated during a write phase to record data in the R/W area at one power level and in the WORM area at another power level. The WORM recording surface is ablative and the R/W recording surface is non-ablative. Hence, the laser in the R/W head is operated at a lower power level when recording in the R/W area and at a higher power level when recording in the WORM area. Two sets of write heads would provide performance gains in that data file writing and directory updating for different files could take place simultaneously.

The foregoing and other objects, features, and advantages of the invention will be apparent from the following more particular description of preferred embodiments of the invention, as illustrated in the accompanying drawings.

Fig. 1 is a diagram of an optical disk embodying the present invention.

Fig. 2 is a diagrammatic sectional view showing various layers of the optical disk of Fig. 1.

Fig. 3 is a diagram showing the drive and controls for reading and recording data on the optical disk embodying the present invention.

Fig. 4 is a bloc k diagram showing that portion of the R/W Control of Fig. 3 for controlling the write function of the laser.

Fig. 5 is a diagram showing the relationship of directory and data records.

Fig. 6 is a diagram showing the relationship of directory and data records after a file has been changed.

Fig. 7 is a diagram showing the relationship of directory and data records where the data records are files with file headers.

Fig. 8 is a diagram of an optical disk where the R/W area is between WORM areas as an alternate embodiment of the invention.

With reference to the drawings and particularly to Fig. 1, the invention is shown by way of example as an optical disk 10 having a WORM area 15 and a R/W area 20. The optical disk 10 is a unified medium but has two distinct and different surfaces In Fig. 2, the optical disk 10 has a substrate 11 which is overlayed with a R/W layer or non-ablative surface 20. A portion of the R/W surface 20 is overlay ed with a WORM layer or ablative surface 15. A clear outer protective coating 25 overlies the surfaces 15 and 20 as shown in Fig. 2. It should be noted that the WORM surface 15 could overlay surface 20 anywhere along surface 20 such a s from its periphery and radially inward any predetermined amount or it could overlay surface 20 in bands of predetermined widths. In any event, there would always be at least one WORM surface or area 15 and at least one R/W surface o r area 20. The location of the surfaces or areas 15 and 20 are detectable by either recorded information i.e. track position sensing or by detectable marks physically formed on the surfaces.

Hence, it should be noted that the present invention facilitates two distinct types of optical data recording, ablative and non-ablative, on a unified medium. Read/Write Control 50, Fig. 3, provides signals to R/W head 40 to operate the same

in first and second write modes depending upon which surface or area information or data is being recorded. R/W head 40 is substantially a conventional optical R/W head but the laser therein operates at least at two different powers. The laser is operated at a R/W power when recording data non-ablatively in the R/W area 20 an d at WORM power when recording data ablatively in the WORM area 15. The WORM recording power is at a higher intensity than the intensity of the R/W power. The WORM recording is ablative whereas R/W is non-ablative. Therefore, irrespective of the method used for making the optical disk 10, the data recording for the R/W and WORM areas would be as already described. For example, optical disk 10 could be constructed as shown in Fig. 2 or the entire surface of the optical disk 10 could be a R/W surface where the spaces for the R/W and WORM area s are separated by a "No Write" pit and R/W operations would be prevented on a reas having this pit. The first WORM operation would create a "Never-Write Again" pit which upon being detected subsequently would preclude any further write operations to the Never-Write Again defined space. This could be done on a sector basis.

Another method for making the optical disk 10 is to coat the substrate 11 with a R/W coating but do not provide the final protective coating 25. Then, completely coat the R/W media with the substance, such as Tellerium, normally ablated by the WORM write or record laser power. Then, chemically remove, such as by spraying, the area to be R/W to remove the Tellerium in that area. The two different surface areas would then be fixed as by heat or drying and after rinsing a final sealant coating would be applied. Similar to the chemical ablative process, the optical disk 10 could be made where the Tellerium layer is removed to leave a R/W surface by inserting the optical disk into a WORM drive. The WORM drive would be selectively operated to remove the Tellerium in the area to form the R/W area. Thereafter, a final sealant coating would be applied.

In Fig. 3, the optical disk 10 is mounted to be driven or rotated about a rotational axis by motor 30. Coded data is recorded onto and read from disk 10 by read/write head 40. Read/write head 40 is selectively movable in the conventional manner along a path to be selectively positioned over a track on disk 10. The control signals for positioning R/W head and for causing it to operate in the Read and Write modes come from R /W Control 50. R/W Control 50, in this example, is shown as receiving signals from controller 75.

Controller 75 could be a stand alone controller or be connected on line to a host computer system. In either configuration, controller 75 provides Read or Write command signals to R/W control 50. R/W control 50 responds to the Read/Write command signals to produce R/W control signals which are applied to R/W head 40. In this invention, R/W control 50 must provide laser write signals to cause the laser in R/W head 40 to operate at least at two different intensity levels as a function of the Write command signal from controller 75. If a Write operation is to take place in the WORM area 15, the R/W Control 50 sends a signal to R/W head 40 to cause the laser therein to operate at an intensity level so as to record data in coded form ablatively. But, if a Write operation is to take place in the R/W area 20, R/W Control 50 provides a control signal to R/W head 40 to cause the laser therein to operate at a R/W intensity level where no ablative action takes place, however, data is recorded in coded form. This R/W recorded data can subsequently be re-written if such is desired. The data recorded ablatively in WORM area 20 can not be re-written.

The controls in R/W Control 50 for controlling the write power level of the laser in R/W head 40 are shown in Fig. 4. Area position data indicating whether the R/W head 40 is in the R/W area 20 or in the WORM area 15 is applied over line 51 to area position logic 55. Area position logic 55 generates a signal on line 56 when the R/W head is in the WORM area 15 and a signal on line 57 when the R/W head is in the R/W area 20. The signals on lines 56 and 57 are applied to blocks 58 and 59 which are responsive thereto to generate control signals Set Laser Power for WORM and Set Laser Power for R/W respectively. The Set Laser Power for WORM and Set Laser Power for R/W signals are applied over lines 60 and 61 respectively to Write Laser Controls block 65. Writing of coded data on optical disk 10 takes place at precise locations on an arcuate track. Hence, R/W head 40 position data is applied over line 66 to R/W Head Position logic block 67. Logic block 67 determines when the R/W Head 40 is over the track on which coded data is to be written and when the arcuate position on that track where writing is to start comes underneath to R/W Head 40. Logic block 67 generates an Enable Laser signal which is applied over line 68 to Write Laser controls 65. The signal from Write Laser Controls 65 is applied over line 69 to the laser in R/W Head 40. By the arrangement described, the laser in the R/W Head 40 is caused to operate at write WORM intensity power level when the R/W Head 40 is recording in the WORM area 15 and to operate at the write R/W intensity power level when the R/W Head 40 is recording in the R/W area 20.

The present invention finds particular utility in a system for storing and retrieving archival data. Archival records are generally long term records and thus the WORM storage medium is ideal for such

records. However, to retrieve records it is expeditious to use a directory. A file of records can be deleted or another version written even though the data remains recorded in the WORM area. Thus, when this occurs, it is desirable to be able to re-write or update the directory so as to contain data for the most recent version of a file. Hence, the directory is written and maintained in the re-writable R/W area 20.

In Fig. 5, files A, B etc. are written in the WORM area 15 and the directory for these files is written in the R/W area 20. The description of file A in the directory is re-written, for example, to reference the newest version of file A as in Fig. 6. The normal directory structure only supports locating the "current" version of a file when there are multiple versions. In some instances; however, it is desirable to retrieve an older version. This is accomplished by placing a "header" in front of each data file as shown in Fig. 7. Although, the searching of files in this manner would not be efficient, it does allow location of any version of any file when it is necessary to refer to an older or "archival" version of a file.

It should be recognized that the optical disk 10 could be made so that t he directory or R/W area 20 is at the inner portion of the disk and the WORM area 15 at the outer portion. Other arrangements are possible, such as shown in Fig. 8 where the R/W area 20 is between WORM areas 15.

It should also be recognized that separate or multiple R/W heads could be used, one for reading and writing data in R/W area 20 and one for reading and writing in the WORM area 15. This would provide a performance gain but would be more expensive.

From the foregoing, it is seen that the invention provides an optical disk having at least two different types of recording areas but where re cording can be done by the same R/W head by dynamically changing the write power to the R/W head depending upon which type of recording area underlies the R/ W head. It is also seen that the present invention is particularly useful for data storage systems where a directory is used to locate a record file. While the invention has been particularly shown and described with reference to p referred embodiments thereof, it will be understood by those skilled in the ar t that various changes in form and details may be made therein without deporting from the spirit and scope of the invention.

Claims

1. An optical record medium on which data is to be recorded comprising: at least one data recording surface having characteristics enabling optical recording of data non-ablatively, and at least one data recording surface having characteristics enabling optical recording of data ablatively.

2. The optical record medium of claim 1 where the record medium is a disk.

3. The optical record medium of claim 1 or 2 where in said data recording surface having characteristics enabling recording ablatively is interior of said data recording surface having characteristics enabling recording of data non-ablatively.

4. The optical record medium of claim 2 or 3 wherein said data recording surfaces are on opposite sides of said disk.

5. An optical data recording system including an optical disk, an optical R/W head, a controller for controlling the energization of said R/W head, the improvement comprising:
ablative and nonablative optical recording surfaces formed on said optical disk and means in said controller for operating said R/W head in ablative and nonablative recording modes.

6. The optical data recording system of claim 5 wherein data recorded by said R/W head operating in said ablative recording mode is non-erasable.

7. The optical recording system of claim 5 or 6 wherein data recorded by said R/W head operating in said nonablative recording mode is erasable.

8. An optical record medium on which data is to be recorded comprising:
at least one data recording surface having characteristics enabling optical recording of data permanently, and at least one data recording surface having characteristics enabling optical recording of data rewriteably.

9. A method for recording data whereby data is recorded on at least one data recording surface having characteristics enabling optical recording of data non-ablatively, and on at least one data recording surface having characteristics enabling optical recording of data ablatively.

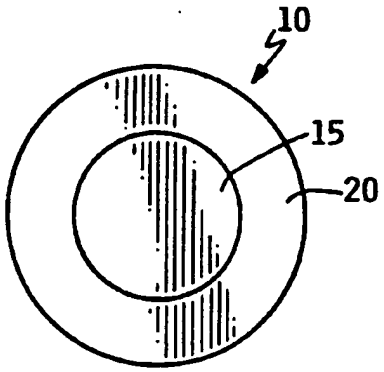

FIG. 1

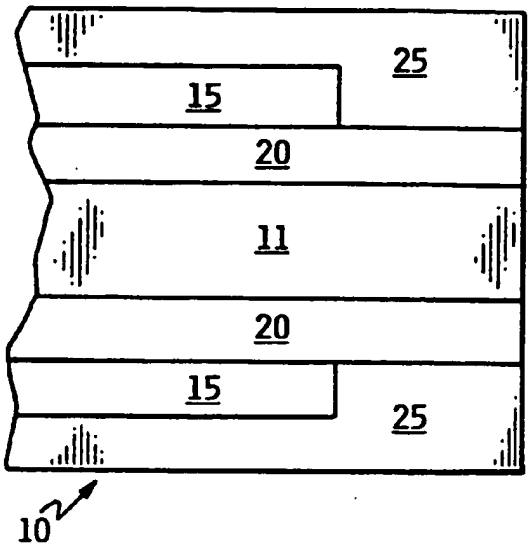

FIG. 2

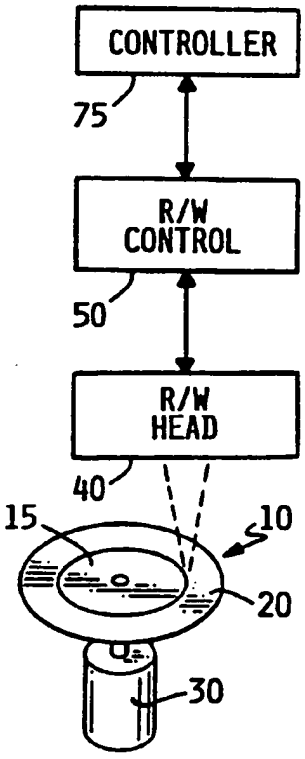

FIG. 3

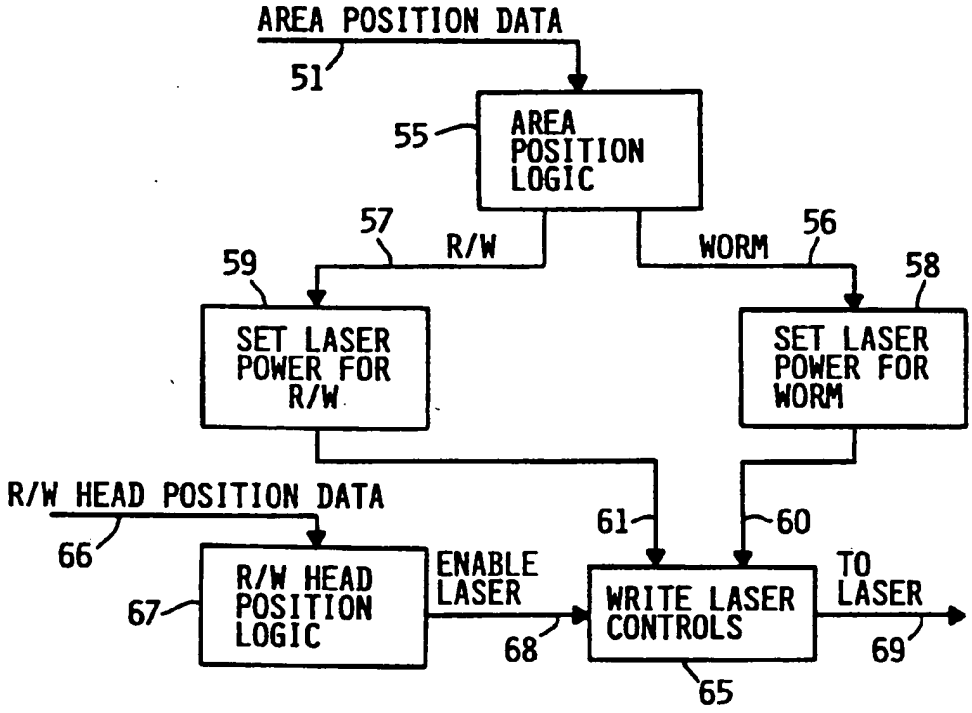
AREA POSITION DATA
51
55
AREA POSITION LOGIC
57
R/W
56
WORM
59
58
SET LASER POWER FOR R/W
SET LASER POWER FOR WORM
R/W HEAD POSITION DATA
66
61
60
67
R/W HEAD POSITION LOGIC
ENABLE LASER
WRITE LASER CONTROLS
TO LASER
68
69
65

FIG. 4

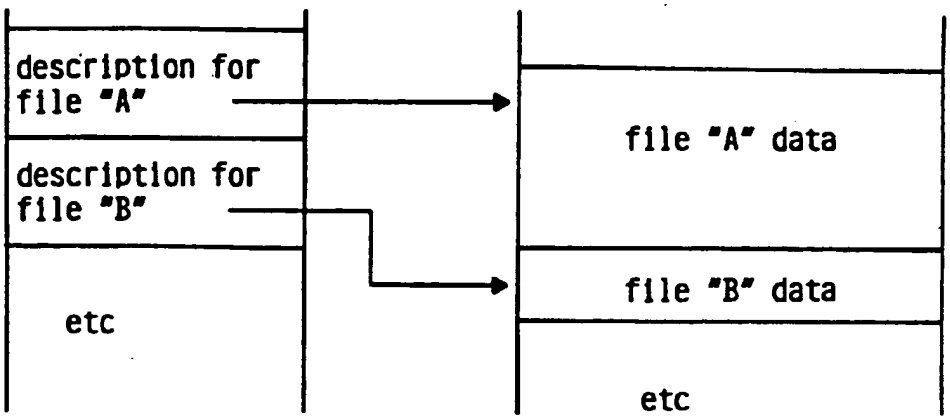
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FIG. 5

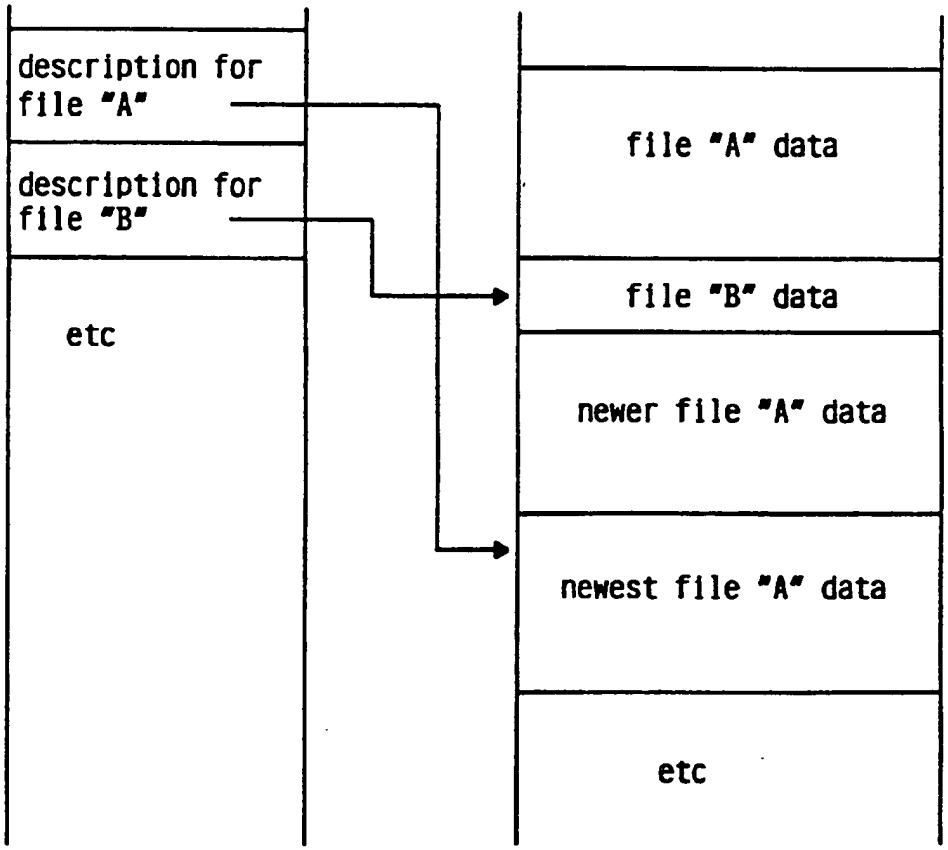
description for file "A"
description for file "B"
etc
file "A" data
file "B" data
newer file "A" data
newest file "A" data
etc

FIG. 6

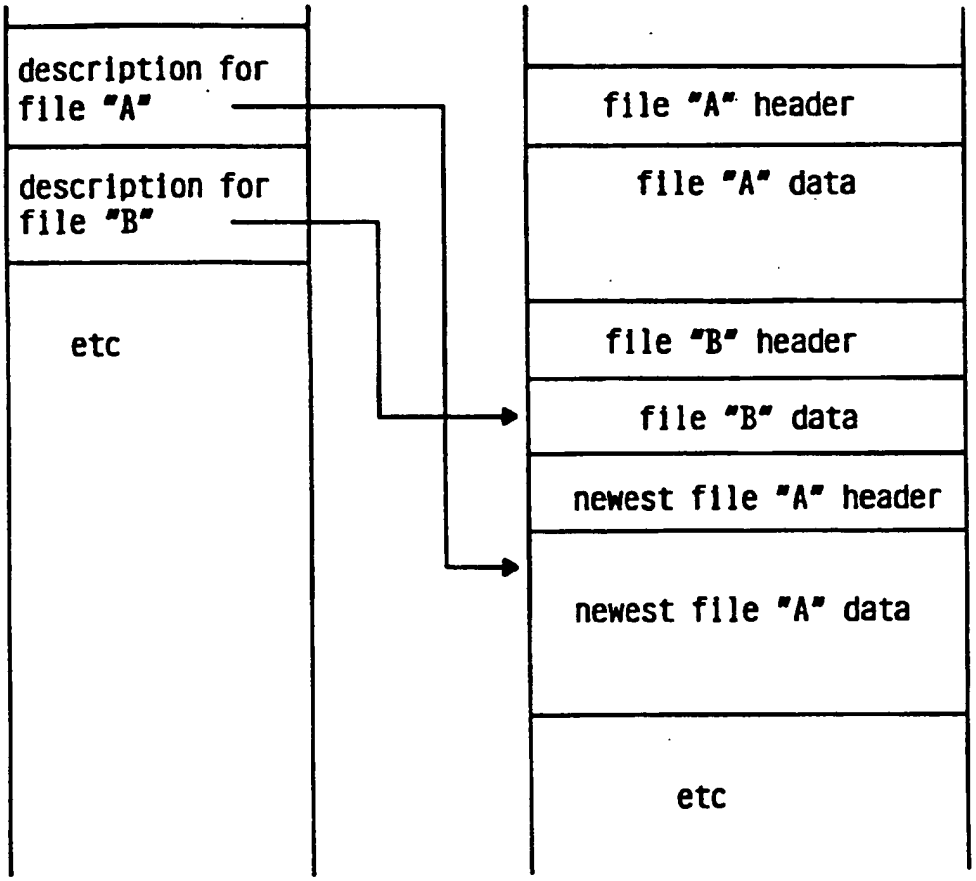
description for file "A"
description for file "B"
etc
file "A" header
file "A" data
file "B" header
file "B" data
newest file "A" header
newest file "A" data
etc

FIG. 7

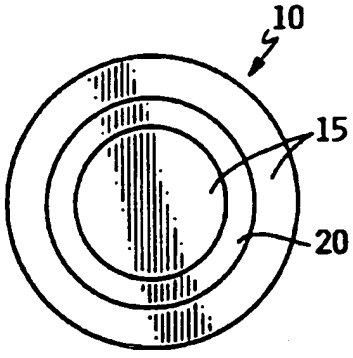
10
15
20

FIG. 8

European Patent Office

EUROPEAN SEARCH REPORT

Application Number

EP 93 20 0847

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
X	PATENT ABSTRACTS OF JAPAN vol. 16, no. 58 (P-1311)13 February 1992 & JP-A-03 256 244 (RICOH CO) 14 November 1991 * abstract *	1,2,4-9	G11B7/007 G11B7/24
X A	PATENT ABSTRACTS OF JAPAN vol. 12, no. 194 (P-713)7 June 1988 & JP-A-62 298 982 (HITACHI) 26 December 1987 * abstract *	1,2,5-9 3	
X	PATENT ABSTRACTS OF JAPAN vol. 10, no. 147 (P-460)(2204) 29 May 1986 & JP-A-60 263 353 (MATSUSHITA DENKI SANGYO) 26 December 1985 * abstract *	1-3,5-9	
X	PATENT ABSTRACTS OF JAPAN vol. 8, no. 179 (P-295)17 August 1984 & JP-A-59 071 144 (CANON K K) 21 April 1984 * abstract *	1,2,5-9	TECHNICAL FIELDS SEARCHED (Int. Cl.5) G11B
X	PATENT ABSTRACTS OF JAPAN vol. 7, no. 224 (P-227)5 October 1983 & JP-A-58 114 343 (FUJITSU K K) 7 July 1983 * abstract *	1,2,5-9	
A	PATENT ABSTRACTS OF JAPAN vol. 12, no. 125 (P-691)19 April 1988 & JP-A-62 250 532 (TEAC) 31 October 1987 * abstract *	1-3,5-9	
A	GB-A-2 157 035 (OLYMPUS OPTICAL CO) * the whole document *	1-9	

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	22 JULY 1993	ANNIBAL P.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

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(54) Mass document storage and retrieval system.

(57) A sequence of documents is delivered to an optical scanner in which each document is scanned to form a digital image representation of the content of the document. In one embodiment, the image representation is converted into code (ASCII) and is automatically examined by data processing apparatus to select search words which meet predetermined criteria and by which the document can subsequently located. In another embodiment, the image is not converted. The search words are stored in a non-volatile memory in code form and the entire document content is stored in mass storage, either in code or image form. Techniques for selecting the search words are disclosed.

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This invention relates to a system for the mass storage of documents and to a method for automatically selecting search words by which the documents can be retrieved on the basis of the document content.

Various systems are used for the mass storage and retrieval of the contents of documents including systems such as those disclosed in U.S. Patents 4,273,440; 4,553,261; and 4,276,065. While these systems are indeed quite usable and effective, they generally require considerable human intervention. Other systems involve storage techniques which do not use the available technology to its best advantage and which have serious disadvantages as to speed of operation and efficiency. In this context, the term "mass storage" is used to mean storage of very large quantities of data in the order of, e.g., multiple megabytes gigabytes or terabytes. Storage media such as optical disks are suitable for such storage although other media can be used.

Generally speaking, prior large-quantity storage systems employ one of the following approaches:

A. The content of each document is scanned by some form of optical device involving character recognition (generically, OCR) so that all or major parts of each document are converted into code (ASCII or the like) which code is then stored. Systems of this type allow full-text code searches to be conducted for words which appear in the documents. An advantage of this type of system is that indexing is not absolutely required because the full text of each document can be searched, allowing a document dealing with a specific topic or naming a specific person to be located without having to be concerned with whether the topic or person was named in the index. Such a system has the disadvantages that input tends to be rather slow because of the conversion time required and input also requires human supervision and editing, usually by a person who is trained at least enough to understand the content of the documents for error-checking purposes. Searching has also been slow if no index is established and, for that reason, indexing is often done. Also, the question of how to deal with non-word images (graphs, drawings, pictorial representations) must be dealt with in some way which differs from the techniques for handling text in many OCR conversion systems. Furthermore, such systems have no provision for offering for display to the user a list of relevant search words, should the user have need for such assistance.

B. The content of each document is scanned for the purpose of reducing the images of the document content to a form which can be stored as images, i.e., without any attempt to recognize or convert the content into ASCII or other code. This type of system has the obvious advantage that graphical images and text are handled together in the same way. Also, the content can be displayed in the same form as the original document, allowing one to display and refer to a reasonably faithful reproduction of the original at any time. In addition, rather rapid processing of documents and storage of the contents is possible because no OCR conversion is needed and it is not necessary for a person to check to see that conversion was proper. The disadvantages of such a system are that some indexing technique must be used. While it would be theoretically possible to conduct a pattern search to locate a specific word "match" in the stored images of a large number of documents, success is not likely unless the "searched for" word is presented in a font or typeface very similar to that used in the original document. Since such systems have had no way of identifying which font might have been used in the original document, a pattern search has a low probability of success and could not be relied upon. Creating an index has traditionally been a rather time consuming, labor-intensive task. Also, image storage systems (i.e., storing by using bit-mapping or line art or using Bézier models) typically require much more memory than storing the equivalent text in code, perhaps 25 times as much.

Various image data banks have come into existence but acceptance at this time is very slow mainly due to input and retrieval problems. Because of the above difficulties, mass storage systems mainly have been restricted to archive or library uses wherein retrieval speed is of relatively little significance or wherein the necessary human involvement for extensive indexing can be cost justified. There are, however, other contexts in which mass storage could be employed as a component of a larger and different document handling system if the above disadvantages could be overcome.

An object of the present invention is to provide a method of handling input documents, storing the contents of the documents and automatically creating a selection of search words for the stored documents with little or no human intervention.

A further object is to provide a method of machine-indexing contents of documents which are to be stored in image form in such a way that the documents can be retrieved.

Another object is to provide a method to display search words to users in an indexed or a non-indexed system.

Briefly described, the invention comprises a method of retrievably storing contents of a plurality

of documents having images imprinted thereon comprising optically scanning the documents to form a representation of the images on the documents. A unique identification number can be assigned to each document and to the image representation of each document. Search words are automatically selected from each document to be used in locating the document from mass storage. The selected search words are converted to code, correlating the converted search words with the unique identification number of the document from which the search words were selected. The search words are stored in code, and the image representation of each document is stored in mass storage or the entire text is converted into ASCII or other code with the search words being retained in separate storage for display to users when desired.

It should be kept in mind that the invention contemplates three possible approaches which have their own advantages and disadvantages. In one approach, the text is "read" by a scanner or the like and kept in a bit-mapped or similar digital form, as it emerges from the scanner rather than being converted into ASCII or other code. Search words are extracted and converted into code but the main body of the text is stored (in mass storage) as an image. In the second approach, the entire document (to the extent possible) is converted, search words are selected and stored in code form, and the entire text is stored in code. In the third approach, the document is also entirely converted (to the extent possible) and search words are selected but the document is finally stored in image form. Except for the search words, the converted text is not saved in mass storage.

In order to impart full understanding of the manner in which these and other objects are attained in accordance with the invention, particularly advantageous embodiments thereof will be described with reference to the accompanying drawings, which form part of this specification, and wherein:

Fig. 1 is a flow diagram illustrating the overall steps of a first embodiment of a document processing method in accordance with the invention;

Fig. 2 is a flow diagram illustrating the steps of a second embodiment of a document processing method in accordance with the invention;

Fig. 3 is a flow diagram illustrating a search word selection process in accordance with the invention;

Fig. 4 is a block diagram of a system in accordance with the invention; and

Fig. 5 is a flow diagram illustrating a retrieval method in accordance with the invention.

The present invention will be described in the context of a system for handling incoming mail in an organization such as a corporation or government agency which has various departments and employees and which receives hundreds or thousands of pieces of correspondence daily. At present, such mail is commonly handled manually because there is no practical alternative. Either of two approaches is followed, depending on the size and general policies of the organization: in one approach, mail is distributed to departments, and perhaps even to individual addressees, before it is opened, to the extent that its addressee can be identified from the envelope; and in the other approach, the mail is opened in a central mail room and then distributed to the addressees. In either case, considerable delay exists before the mail reaches the intended recipient. In addition, there is very little control over the tasks which are to be performed in response to the mail because a piece of mail may go to an individual without his or her supervisor having any way to track the response. Copying (i.e., making a paper copy) of each piece of mail for the supervisor is, of course, unnecessarily wasteful. The present system can be used to store and distribute such incoming mail documents.

Referring first to Fig. 1, at the beginning of the process of the present invention, each incoming document 20 is delivered 21 to a scanner and is automatically given a distinctive identification (ID) number which can be used to identify the document in both the hard copy form and in storage. The ID number can be printed on the original of the document, in case it becomes necessary to refer to the original in the future. Preferably, the ID number is a 13 digit number of which two digits represent the particular scanner (in the event that the organization has more than one) or the department in which or for which the incoming documents are being processed, two digits represent the current year, three digits represent the day of the year and six digits represent the time (hour, minute and second).

The number is automatically provided by a time clock as each document is fed into the system. For reasons which will be discussed below, it is anticipated that most documents will be processed in a time of about two seconds each which means that the time-based ID number will be unique for each document. As the number is being printed on the document, it is supplied to non-volatile storage, such as a hard disk, for cross reference use with other information about the document.

While use of the ID number is clearly preferred, it would be possible to group documents, as by week or month received, and rely on other criteria to locate specific documents within each group. In such a case, the ID number would not be unique to each individual document but some other

form of identification can enable reference to a specific document.

In order for the processing to be reliable, there are certain prerequisites for the documents, systems and procedures to allow the documents to be processed. Most of these are common to all conversion systems, not only those of the present invention. Currently available hardware devices are capable of performing these functions. The criteria are:

a. Each document should be easily readable, i.e., have reasonably good printing.

b. The print should be on one side of the page only. For documents having printing on both sides, it should be standard practice to use one side only.

c. The scanner should have a document feeder.

d. A copying machine should be available for either

-- copying documents darker when the original is too light, or

-- copying damaged or odd-size documents not suitable for feeder input.

e. Character recognition software used with the system must be powerful and able to convert several different fonts appearing on one page.

f. Preferably the software should also be able to convert older type fonts and must be able to separate text and graphics appearing on the same page.

At this preliminary stage, pre-run information 22 can also be supplied to the apparatus to set, for example, the two-digit portion indicating the department for which documents are being processed. This is helpful if a single scanner is to be used for more than one department or if a scanner in one department is temporarily inoperative and one for another department is being used.

The documents are fed into the scanner, after or concurrently with assignment of the ID number, the scanner being of a type usable in optical character recognition (OCR) but without the usual recognition hardware or software. The scanner thus produces an output which is typically an electrical signal comprising a series of bits of data representing successive lines taken from the image on the document. Each of the successive lines consists of a sequence of light and dark portions (without gray scales) which can be thought of as equivalent to pixels in a video display. Several of these "pixel lines" form a single line of typed or printed text on the document, the actual number of pixel lines (also referred to as "line art") needed or used to form a single line of text being a function of the resolution of the scanner.

In conventional OCR, software is commonly used to analyze immediately the characteristics of each group of pixel lines making up a line of text in an effort to "recognize" the individual characters and, after recognition, to replace the text line with code, such as ASCII code, which is then stored or imported into a word processing program. In one aspect of the present invention (Fig. 1), recognition of the full text is not attempted at this stage. Rather, the data referred to above as pixel lines is stored in that image form without conversion. In the other approach (Fig. 2), the full text is converted into code and is then stored in mass storage (e.g., optical disk) while the converted search words are stored, as suggested above, in a readily accessible form of non-volatile memory such as a hard disk. In this connection, memory such as random access memory, buffer storage and similar temporary forms of memory are referred to herein as either RAM or volatile memory and read/write memory such as hard disk, diskette, tape or other memory which can be relied upon to survive the deenergization of equipment is referred to as non-volatile memory.

The pixel line image is stored in a temporary memory such as RAM 24 and the ID number, having been generated in a code such as ASCII by the time clock or the like concurrently with the printing, is stored in code form and correlated in any convenient fashion with its associated document image.

As will be recognized, the image which is stored in this fashion includes any graphical, non-text material imprinted on the document as well as unusually large letters or designs, in addition to the patterns of the text. Commonly, incoming correspondence will include a letterhead having a company logo or initials thereon. At this stage 26 of the process, the image can be searched to determine if patterns indicative of a logo or other distinctive letterhead (generically referred to herein as a "logo") is present. This can be automatically performed by examining the top two to three inches of the document for characters which are larger than normal document fonts or have other distinctive characteristics. By "automatically" it is meant that the step can be performed by machine, i.e., by a suitably constructed and programmed computer of which examples are readily available in the marketplace. The term "automatically" will be used herein to mean "without human intervention" in addition to meaning that the step referred to is done routinely.

If such a logo is found, 28, a comparison 30 can be made to see if the sender's company logo matches a known logo from previous correspondence. This information can be useful in subsequent retrieval. For this purpose, a data table 32 including stored patterns of known logos is maintained correlated with the identification of the sending organization, the pattern information in the table 32 being in the same form as the signals produced

by the scanner so that the scanner output can be compared with the table to see if a pattern match exists.

To seek a pattern match, a comparison is performed preferably using a system of the type produced by Benson Computer Research Corporation, McLean, Virginia which utilizes a search engine employing parallel processing and in-memory data analysis for very rapid pattern comparison. If the letterhead/logo on a document is recognized, 34, an identification of the sender, including address, is attached, 36, to the ID number for that particular document for subsequent use as a search word. If no pattern match is found, a flag can be attached to the ID number for that document to indicate that fact, allowing human intervention to determine whether the logo pattern should be added to the existing table.

As will be discussed, the ID number and any additional information which is stored with that number, as well as search words to be described, are ultimately stored in code rather than image form. Such code is preferably stored on a hard disk while the images are ultimately stored in a mass store such a WORM (write once, read many times) optical disk. Meanwhile, all such data is held in RAM.

At this stage, the system enters into a process of selecting search words and other information from the remaining parts of the document to allow immediate electronic distribution as well as permanent storage of the documents which have specifically designated addressees and to permit subsequent retrieval on the basis of information contained in the document. Some of the techniques for doing these tasks are language- and custom-dependent, as will be discussed, and the techniques must thus be tailored to the languages and customs for the culture in which the system is intended to be used. A general principle in this embodiment is to attempt to recognize portions of the document which are likely to contain information of significance to subsequent retrieval before the document is converted into code and to then convert into code only specific search words within those recognized portions.

It is customary in many countries to have the date of the letter and information about the addressee isolated at the top of a letter following a logo, or in a paragraph which is relatively isolated from the remainder of the text. This part of the letter easily can be recognized from the relative proportion of text space to blank space without first converting the text into code. Once recognized, 38, this portion can be converted, identified as "date" and "addressee" information 40 and stored with the document ID. All known arrangements for writing a date can be stored in a data table for comparison with the document so that the date and its characteristics can be recognized.

If the date and addressee information cannot be recognized in a specific document, the ID for that document is flagged 42 for human intervention so that the date is manually added to the extent that it is available. In this context, the "addressee" would normally be either a specifically named person or a department within the overall organization. To facilitate identifying the addressee, a table can be maintained with individual and department names for comparison.

At this stage of the process, normally about two seconds or less after the document has been introduced into the scanner, enough information will have been determined (in most cases) for the system to send to the individual addressee, as by a conventional E-mail technique, notification 44 that a document has been received, from whom, and that the text is available from mass storage under a certain ID number. If desired, the image of the entire document can be transmitted to the addressee but a more efficient approach is to send only notification, allowing the intended recipient to access the image from mass storage.

In a similar fashion, the name of the individual sender, as distinguished from a company with which the individual might be employed, is usually readily recognizable, 46, near the end of the document page on which it appears. If recognizable, the sender's name and/or title is chosen routinely, 48, as one of the search words. Additionally, it will be recognized that the presence of the sender's name at the end is an indication that the page on which it appears is the last page of that specific document, while the presence of the addressee's name near the top indicates that the page is the first page. An indication of Attachments at the bottom can also be chosen to show that there is more to be associated with the letter.

Multiple page documents can be recognized by the absence of letterhead information on the second and subsequent pages and by the presence of a signature on a page other than the one with address information. It is important to correlate all subsequent pages with the first page so that when a multiple page document is found in a search, the first page is displayed and the user can then "leaf through" the document by sequentially displaying the subsequent pages.

If a specific document exhibits any problems with character recognition, 50, the search words and related material are stored and the ID flagged for human attention, 52. The human review 56 is for the purpose of determining the reasons for the problem, correcting them if possible and either retrying the machine processing or manually entering the desired information.

The next task, 54, is to identify by machine those words in the text of the document which are significant to the meaning of the document and which can be used as search words, apart from identification of the sender, addressee, etc. The manner in which this task will be accomplished is more language-dependent than the above. A more complete discussion of the text search word selection process follows with reference to Fig. 3. The chosen search words are converted to code, 58, stored with, or correlated with, the ID number and the image itself is transferred to the mass store. If more documents are to be processed, 60, the method starts again at 21.

To summarize, the documents received by a company are analyzed to identify and store important words from various parts of each such document. In the example of a business letter, such information should include the following:

Sending organization (letterhead information)
Date of the letter
Addressee (company, organization)
Reference
Individual addressee (Dear Mr. -----)
Search words chosen from text
Presence of enclosure/annex
Individual sender

Fig. 2 shows an alternative embodiment in which the input document text is converted, to the extent possible, at the beginning of the process while the scanning is being performed. This difference leads to a number of other changes throughout the process, although many of the steps are the same. The process of Fig. 2 will be briefly discussed with emphasis on the differences from Fig. 1.

To begin with, the feeding of documents 60 to scanner 61 and the insertion of pre-run information 62 is the same. However, after or concurrently with scanning, the entire document is converted, 63, to code by suitable conventional character recognition equipment and software and stored in volatile memory. As in Fig. 1, the image of the document is stored in RAM, 64, even though the conversion is accomplished. If there are any OCR conversion problems, 65, the ID number is flagged for human review, 66, and correction or manual entry, 67.

The image is searched for a logo pattern, 70, and if a logo is found, 74, its pattern is compared, 75, with patterns stored in a logo table 76. If found, 78, the information stored therein about the sender is added, 80, to the ID data stored. If not, it can be added manually, 82.

The system can be arranged to search for addressee and date information in either the image in RAM or the converted code in RAM, but the preferred method is to search in code, 72. If found, 84, these data are chosen, 86, as search words. If not, the document is flagged for human review, 87. Notification of the receipt of a document, or the entire document, can then be sent to the addressee, 88.

If date and sender information has been found, 90, it is added as search words, 92. The search word selection from the text is performed, 94, chosen words are stored and correlated with the ID number, 96, and the converted image data are stored in WORM or other mass store. As before, the ID and search word information is stored in a non-volatile, rewritable form of memory such as a hard disk. In this approach, storage of the image is possible together with full text conversion or conversion in part as well as conversion of search words into code. On the other hand, total conversion can be used only for the search for, and extraction of search words with, possibly, editing being performed to only the search words or only to the capital letters of the search words. The search in code in this case includes, e.g., date, addressee and sender.

Using this approach, the remainder of the converted text is not stored but is deleted.

Correction of incorrectly converted search words and/or rejections (words which cannot be recognized and converted) can also be reduced to two errors per rejection, or more for any characters following a capital letter. The capital letter itself would have to be correct for later ease and reliability of searching.

Fig. 3 illustrates a process for selecting search words from the text of a document automatically, i.e., without human intervention in the case of most documents, which is a very important part of the present invention. As indicated above, this process can be varied to some extent to take best advantage of characteristics of certain languages, but it need not be.

In documents written in German, for example, it is possible to make use of the fact that certain words are always capitalized, regardless of their positions in a sentence or other grammatical considerations. These words, called "Hauptworte", correspond to nouns in English and therefore are very likely to be important words for selection as search words. The system can thus be arranged to always select words beginning with capital letters, not at the beginning of a sentence, as search words.

The Hauptworte must, of course, be distinguished from other words which are capitalized only because they begin a sentence. It is a simple matter to identify words beginning a sentence since they always follow a full stop, i.e., a period, question mark or exclamation point, but it is then necessary to determine whether such words can be dismissed as unimportant or whether they should also be chosen as search words for storage.

For this purpose, a data table is established which includes words in the subject language, German in this example, which are likely to appear in correspondence. The data table thus may contain as many as 50,000 words, in ASCII or similar code. When the data table is initially constructed, each of these words is marked (with code) as being in one of at least two categories, either as words which are not going to be of interest as search words (e.g., articles, prepositions, etc.) or words which will be of interest. Words which will be of high interest or which are special to the organization's business can form a third category. A comparison of each sentence-starting word with this vocabulary data table is a very quick and simple operation, somewhat analogous to a spell-check in a word processing program, and can be facilitated by using the Benson Computer Research Corporation parallel processing search technique which is extremely fast. Those words which are determined to be of no interest are thereafter ignored as to the current document and those which are of interest are stored as search words in a search data table which will be modified and will grow as time passes and as more documents are processed by the system. As will be recognized, if this search word-selection process is used in connection with the overall process Fig. 1, it will be necessary to convert the "suspected" search words into code before making a final determination of relevance, but in the system of Fig. 2 the words will already be in code.

The approach for selecting search words in the German language can be handled as follows in connection with the system of Fig. 1.

A. Define a capital letter as the first character of an uninterrupted string of characters following a full stop.

B. Convert into code only the first character of that string (not the entire word) which can be a capital or a digit.

C. Check to see if the converted character is a capital letter or a number.

D. If the character is a capital letter, then convert the entire word into code (e.g., ASCII). (This step can be delayed, if desired, until later to make use of a later time when less processing is being accomplished but it is then necessary to "flag" the image so that it can be recognized for later conversion.)

E. Perform all table checks, including a check against the above-mentioned table to see if the word is important (if not, the process ends) and, if it is, a check of the existing search word table to see if the search word already exists.

F. If the search word is not in the table, add it.

It will be apparent that such criteria can be changed to suit the business practices and policies of the organization; a government bureau will have quite different criteria from a manufacturing company. The general approach, however, is likely to be quite the same in that essential identifying material is extracted from each document such that the document can be located and retrieved again, as needed, with minimal recall of specific information. Furthermore, the essential identifying information is extracted from the vast majority of documents without human intervention.

Regarding the matter of indexing, no indexing is required when using a very fast computer search engine such as that developed and marketed by the Benson Computer Research Corporation, McLean, Virginia.

Mention was made above of a search word table which is to be developed. It is important to recognize some characteristics of such a table which are rather basic to the concepts disclosed herein. The table is to have the search words, in code form, with a connection between each search word and the ID of each document in which that search word was found. Thus, although a search word is found in ten documents, it is preferable to store that word only once in the table and associate it with the ID's of the ten documents, although this could be handled differently. It is important to be able to display the search words stored in this table, either totally or partially in order to facilitate a search for documents. Thus, if one wishes to find a particular letter received a year ago from the Siemens company, it is possible to display all search words associated with documents which were found to have the Siemens letterhead in the initial pattern matching within, e.g., a time frame of between 11 and 13 months earlier. Since the table is in code, this is a simple matter of doing a full-text search of the table itself, rejecting any search words not associated with that letterhead, and displaying the rest.

There will, of course, be those documents which cannot be handled automatically. Some will be in unrecognizable fonts or typefaces, some perhaps even handwritten, some will be (or will include) poor quality photocopies and some will be in a language other than one for which the system is set up. These documents will, nevertheless, be stored in image form and will be given an ID number, if using the ID approach. Each document from which nothing of consequence can be recognized by the processing equipment is identified by a unique form of code and all such documents are reviewed by a person to evaluate the problem and separately handle them in a more traditional way. In case the problem is a new font, the font is added to the system.

If English, rather than German, is the language being handled by the system, the approach differs

to the extent that a greater percentage of the text is analyzed using comparison with a vocabulary table to identify nouns, etc. Words not following a full stop but having capital letters are likely to be proper nouns which have a high probability of usefulness as search words and are stored as such. However, since English nouns are not routinely capitalized, use of capitalization as an indicator of search word interest is somewhat less important than in German. The same can be said of French and many other languages.

Referring now to Fig. 3, the process shown therein can be employed in either of the embodiments of Figs. 1 or 2 as blocks 54 or 94. The process starts with the conversion of text 100 earlier in the overall process in the Fig. 2 embodiment and will be assumed to have been done in the following discussion. Each word is checked, 102, to see if it has a capital letter. If it is found to start with a capital, 104, then a check is made to see if the initial character is preceded by a full stop, 106. If not, the word is assumed to be of sufficient relevance to be stored as a search word, 107. However, if it begins a sentence, the word is compared 108 with a "capitalized words vocabulary table" 110 which identifies words such as articles, prepositions and the like, or others, as defined by the user, such as certain Haupt-worte in the German language, as being words not to select, 112, and such words are not stored, 114. All other words are assumed to be of sufficient relevance to store, 107.

As such words are searched for each document, they can be eliminated from the remainder of the text on the ground that a decision has been made about them. All other words are then compared, 116, with a dictionary 118 of the relevant language. This comparison can be facilitated by sorting the words into alphabetical order and eliminating redundancy. As described above, the dictionary is marked to identify words of interest and not of interest, the ones of interest being stored, 107. Remaining text, if any, 119, is examined, 120. If none, the system moves on to the next document, 122.

It is important for the users of the system to be able to add and delete search words when that appears desirable. Assume the situation in which an important letter is received and reviewed by the individual addressee. As he or she takes action regarding the letter, it may appear that one or more specific words of the letter are very important. The addressee calls up a display of the search words for that letter, adds the newly-recognized important words if they are not already present in the search word list, and perhaps deletes others which appear to be of less importance. By this technique, for only those documents which are likely to be most significant, the search word list is refined and improved. Documents of less importance thus, appropriately, receive less individual attention. In order to complement the automatic search word processing, it should also be possible to manually mark individually selected words of documents before the step of scanning so that the marked words are chosen as search words.

In addition, space can be provided in documents in order to enter special search words for conversion and later retrieval of image documents out of storage.

There are a number of ways character conversion to code can be accomplished.

1. The Benson Computer Research Corporation search engine, mentioned above, can be used combined with OCR conversion capabilities so as to use either one processor converting each text line to be converted in succession, or two or more processors can be used, in parallel with other processors concurrently converting different lines of text in the same document.
2. Only the first digit/character of a word, or of a group of characters, can be converted to determine whether that character is a capital letter, as mentioned above. If it is found to be a capital letter, either the remainder of the word is also converted or the image is saved for later conversion. This can be done if necessary in order to avoid delay, i.e., in order to keep the processing time per document within the preferred time of two seconds each for scanning and storing.
3. The images of documents are stored in succession without any conversion. Then, at a later time such as the end of the working day, all of the available data processing capability of the facility can be used for fast, parallel conversion and determination of search words. This approach is suitable in an installation where the processing equipment used for the document handling is expected to also perform other computing functions for the company and it can also be employed, if necessary, to keep within the two second processing time per document.

Grouping search words by logos of companies, or correlating search words with those companies with the ID numbers or other identifiers, permits a display of search words by company when the user of the system is in doubt about what search words to use and for what time periods. These search words should thus be displayable for certain time frames in which they were actually used, e.g.

--Mr. Wagner wrote and appears in May and June--

--Mr. Dempsey wrote and appears in April and June--.

A usable approach to determine whether or not a capital letter is located at the beginning of a word

during line art scanning is to register all first pixels appearing within a line of characters. While this approach will definitely encompass all capital letters it will also involve non-capital letters and numerics occupying the same sites. Nevertheless, this approach will eliminate all small cited non-capital letters for matters of conversion, for determining whether or not they are capital letters.

In order to better the performance of the character recognition program, it is possible to provide, for instance, three character recognition programs to convert the identical search words in parallel and use a majority vote in the event of a failure to convert or doubt about the correctness of conversion (i.e., 2 out of three).

Fig. 4 shows a rather simplified diagram of a system in accordance with the present invention. It will be recognized by those skilled in the art from the above description that the most important aspects of the present invention reside in the software and the system configuration rather than in hardware since each piece of hardware is individually available and is capable of performing the necessary steps of the method without modification. However, in order to be sure that the actual configuration is clear, the system is shown in block form in Fig. 4.

Documents 130 are delivered to a scanner 132 which is preferably accompanied by a time-clock printer to provide unique document identification, as described above, and has a document feeder. Scanner 132 provides the scan data to a computer 134 which is the "heart" of the system in the sense of controlling the sequence of events and the communication between various components. As such, it is provided with volatile and non-volatile memory of adequate capacity to allow the necessary processing, hold the programs and store the tables which are used in connection with the present invention. In addition, the computer 134 has, either as an integral part or as a cooperating processor which could be a separate computer, the necessary hardware and software for character conversion as well as a search engine such as the Benson parallel processor mentioned above. The computer also has the customary keyboard or other input device 136 and a display 138.

Computer 134 is provided with a bidirectional communication bus for data transfer to and from mass storage equipment 140, such as a "juke box" CD-ROM drive for data retrieval which may be part of, or in addition to, apparatus for storing newly processed data on the mass storage media.

A network server or other form of communications link 142 provides bidirectional communication between computer 134 and a plurality of user stations represented by stations 144 - 147 which constitute the apparatus of the addressees in the foregoing discussion. Normally, each such station will have a terminal or a personal computer giving access to the system, including memory to which messages can be delivered. Through link 142, the user stations can receive information about documents processed and stored by the system and can obtain access to any of the data stored in mass store 140 as well as the search information, including lists of search words and the like, discussed above.

In view of the extensive discussion of the method of the invention above, it does not appear to be necessary to further discuss the operation of the system of Fig. 4.

Fig. 5 shows the general approach for retrieving one or more documents stored in accordance with the present invention, although much of the retrieval technique will have been apparent from the above description. It will, for example, be obvious from the above that the purpose of extracting and storing the search words is to provide an efficient "handle" by which the documents can be found again. Thus, to begin a search, one enters into the computer 136 one or more search words, 150. The search word or words entered can simply be recalled from the memory of the person doing the searching, as will frequently be the case. For example, if a person at station 146 is seeking a letter about a matter relating to a rear axle, he or she might enter the words "rear axle" as the search words.

The entered search words are compared, 152, with search words stored in the memory associated with the computer 134. If a match is found, 154, the computer displays, 156, at the user station a number of documents found with that word or combination of words. The number may be too large for expeditious review, 158, in which case the user can elect, 160, to restrict the search to letters only from the Volkswagen company, whereupon the comparison is made again. When the number of documents is reduced to one or at least to a reasonable number for review, the documents can be displayed and visually reviewed until the desired one is located. The user can then choose to have the document printed or can simply learn the needed information from the display and quit, 164.

If the search word initially chosen results in nothing being found, 154, the user can ask, 166, for a display of all search words involving, for example, correspondence from the Volkswagen company. Review of this display, 168, might result in recognition of the word "differential" which could have been used in the letter. That word is chosen, 170, and a comparison, 152, is conducted using that term, resulting in locating the desired document.

It is important for the comparison 152 to be

done in such a way that not an exact match need exist for the system to regard it as a "hit". This is especially important when searching for the names of individuals which can have variable spelling. This is possible by partial match.

While certain advantageous embodiments have been chosen to illustrate the invention, it will be understood by those skilled in the art that various modifications can be made therein without departing from the scope of the invention as defined by the appended claims.

Claims

1. A method of retrievably storing contents of a plurality of documents having images imprinted thereon comprising

   optically scanning the documents to form a digital representation of the images on the documents;

   automatically assigning an identification to each document and to the image representation of each document;

   automatically machine-selecting search words from each document to be used in locating the document from mass storage;

   converting the selected search words to code;

   correlating the converted search words with the identification of the document from which the search words were selected,

   storing the converted search words in code in a non-volatile memory; and

   storing in mass storage the image representation of each document.

2. A method according to claim 1 wherein said identification of the document is a unique identification number.

3. A method according to claim 2 and further comprising searching for a document by the steps of selecting a search word,

   entering into volatile memory the search word in code,

   comparing the search word with search words stored in the non-volatile memory until a match is found,

   recalling from mass storage the image representations of those documents having identification numbers associated with the matched search word in the non-volatile memory, and

   displaying an image thereof.

4. A method according to claim 3 wherein images imprinted on at least some of said documents include logo designs which identify organizations originating the documents, including the steps of

   forming a logo table of stored images of logo designs identifying the organizations together with information in code form about the sender employing each such design,

   when a document having a design is scanned, conducting a pattern search of the stored images in the logo table to seek a match between the scanned design and a stored image,

   when a pattern match is found, retrieving and correlating with the identification of the document the identifying organization information associated with the matched pattern from the logo table, and

   when a match is not found, flagging the document for manual addition of the design and identifying company information to the logo table.

5. A method according to claim 3 and further comprising defining a search word partial match as a match between a predetermined percentage of characters in the search word and the word stored in the non-volatile memory, and

   recalling documents associated with stored words located in the search by a partial match.

6. A method according to claim 3 and further comprising converting the content of a selected document located in the search into code.

7. A method according to claim 2 wherein the step of storing in mass storage is performed immediately following the step of scanning, and the steps of selecting search words and converting the selected search words are performed at a subsequent time to efficiently utilize character recognition and conversion machine capability.

8. A method according to claim 2 and further

comprising

recalling from non-volatile memory into volatile memory and displaying a list of search words stored in the memory,

manually editing the list of search words.

9. A method according to claim 8 including the step of

recalling from mass storage and displaying a selected document,

and wherein the list of search words recalled and displayed includes words associated only with the displayed selected document.

10. A method according to claim 2 and further comprising manually marking selected words of documents before the step of scanning so that marked words are chosen as search words.

11. A method according to claim 2 and including, in the step of automatically selecting search words,

determining the existence and location of addressee information on documents containing addressee information, and including that addressee information among the selected search words.

12. A method according to claim 11 and including, in the step of automatically selecting search words,

determining the existence and location of sender identifying information on documents containing sender identifying information, and including that sender identifying information among the selected search words.

13. A method of retrievably storing contents of a plurality of documents having images imprinted thereon comprising

optically scanning the documents to form a digital representation of the images on the documents;

automatically assigning an identification to each document and to the image representation of each document;

immediately converting to code those portions of the images which are convertible text;

automatically machine-selecting search words from the converted code for each document to be used in locating the document from mass storage;

correlating the converted search words with the identification of the document from which the search words were selected,

storing the converted search words in code in a non-volatile memory; and

storing in mass storage the code representation of each document.

14. A method according to claim 13 wherein said identification of the document is a unique identification number.

15. A method according to claim 14 and further comprising searching for a document by the steps of

selecting a search word,

entering into volatile memory the search word in code,

comparing the search word with search words stored in the non-volatile memory until a match is found,

recalling from mass storage the code representations of those documents having identification numbers associated with the matched search word in the non-volatile memory, and

forming a display thereof.

16. A method according to claim 15 wherein images imprinted on at least some of said documents include logo designs which identify organizations originating the documents, including the steps of

forming a logo table of stored images of logo designs identifying the organizations together with information in code form about the sender employing each such design,

when a document having a design is scanned, conducting a pattern search of the stored images in the logo table to seek a match between the scanned design and a stored image,

when a pattern match is found, retrieving and correlating with the identification of the docu-

ment the identifying organization information associated with the matched pattern from the logo table, and

when a match is not found, flagging the document for manual addition of the design and identifying company information to the logo table.

17. A method according to claim 15 and further comprising defining a search word partial match as a match between a predetermined percentage of characters in the search word and the word stored in the non-volatile memory, and

recalling documents associated with stored words located in the search by a partial match.

18. A method according to claim 14 wherein the step of storing in mass storage is performed immediately following the step of converting, and the step of selecting search words is performed at a subsequent time to efficiently utilize character recognition and conversion machine capability.

19. A method according to claim 14 and further comprising

recalling from non-volatile memory into volatile memory and displaying a list of search words stored in the memory,

manually editing the list of search words.

20. A method according to claim 19 including the step of

recalling from mass storage and displaying a selected document,

and wherein the list of search words recalled and displayed includes words associated only with the displayed selected document.

21. A method according to claim 14 and further comprising manually marking selected words of documents before the step of scanning so that marked words are chosen as search words.

22. A method according to claim 14 and including, in the step of automatically selecting search words,

determining the existence and location of addressee information on documents containing addressee information, and including that addressee information among the selected search words.

23. A method according to claim 22 and including, in the step of automatically selecting search words,

determining the existence and location of sender identifying information on documents containing sender identifying information, and including that sender identifying information among the selected search words.

24. A method of retrievably storing contents of a plurality of documents having images imprinted thereon comprising

optically scanning the documents to form a digital representation of the images on the documents and temporarily storing each said image;

automatically assigning an identification to each document and to the image representation of each document;

converting to code those portions of the images which are convertible text;

automatically machine-selecting search words from the converted code for each document to be used in locating the document from mass storage;

correlating the converted search words with the identification of the document from which the search words were selected,

storing the converted search words in code in a non-volatile memory; and

storing in mass storage the image representation of each document.

25. An apparatus for retrievably storing contents of a plurality of documents having images imprinted thereon comprising

means for feeding and optically scanning a series of documents to form a digital image representation of the images on said documents;

means for automatically assigning an identification to each document and to said image representation of each document;

means for automatically selecting search words from each said document for subsequent use in locating the document from mass storage;

means for converting the selected search words to code, correlating the converted search words with said identification of the document from which the search words were selected, and storing the converted search words in code in a non-volatile memory; and

means for storing in mass storage the image representation of each document.

26. An apparatus for retrievably storing contents of a plurality of documents having images imprinted thereon comprising the combination of

means for feeding and optically scanning a series of documents to form a digital image representation of the images on said documents;

means for automatically assigning an identification to each document and to said image representation of each document;

means for converting to code those portions of the images which are convertible text;

means for automatically selecting search words from each said document for subsequent use in locating the document from mass storage;

means for correlating the search words with said identification of the document from which the search words were selected, and storing the search words in code in a non-volatile memory; and

means for storing in mass storage the code representation of each document.

27. An apparatus for retrievably storing contents of a plurality of documents having images imprinted thereon comprising the combination of

means for feeding and optically scanning a series of documents to form a digital image representation of the images on said documents and for temporarily storing each said image;

means for automatically assigning an identification to each document and to said image representation of each document;

means for converting to code those portions of the images which are convertible text;

means for automatically selecting search words from each said document for subsequent use in locating the document from mass storage;

means for correlating the search words with said identification of the document from which the search words were selected, and storing the search words in code in a non-volatile memory; and

means for storing in mass storage the image representation of each document.

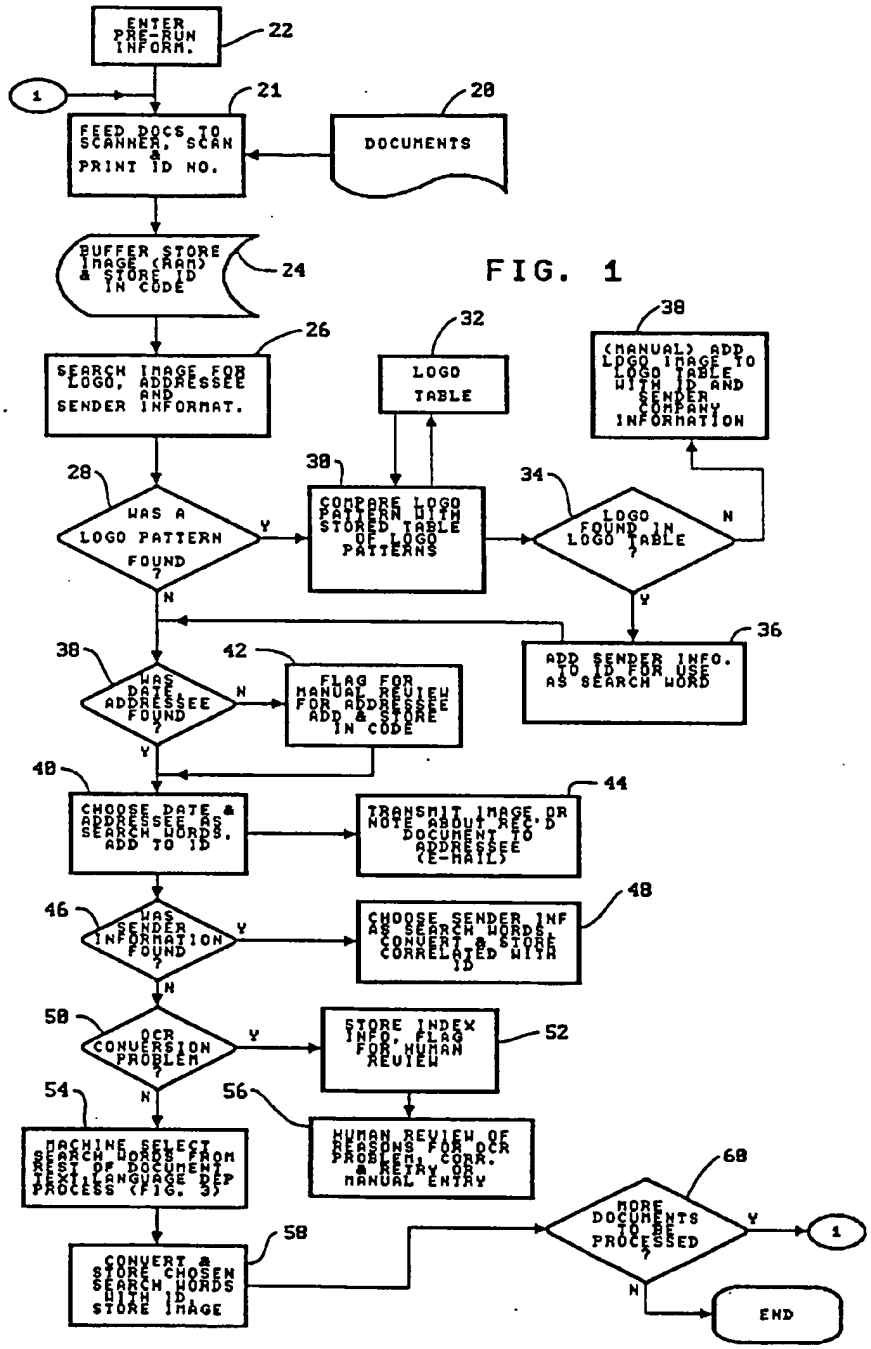
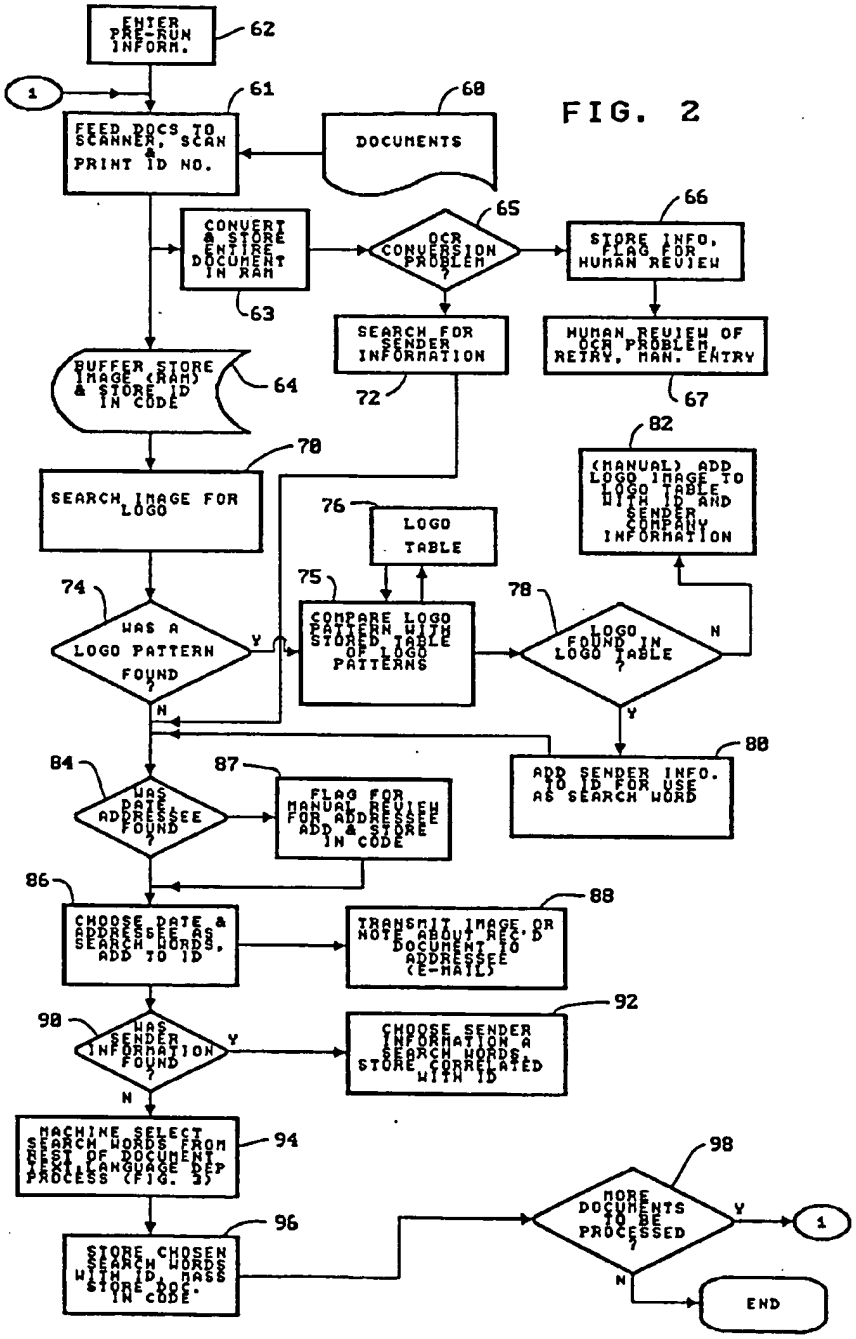

ENTER PRE-RUN INFORM.
22
1
21
FEED DOCS TO SCANNER, SCAN & PRINT ID NO.
20
DOCUMENTS
BUFFER STORE IMAGE (RAM) & STORE ID IN CODE
24
26
SEARCH IMAGE FOR LOGO, ADDRESSEE AND SENDER INFORMAT.
32
LOGO TABLE
38
(MANUAL) ADD LOGO IMAGE TO LOGO TABLE WITH ID AND SENDER COMPANY INFORMATION
28
WAS A LOGO PATTERN FOUND ?
Y
N
38
COMPARE LOGO PATTERN WITH STORED TABLE OF LOGO PATTERNS
34
LOGO FOUND IN LOGO TABLE ?
N
Y
36
ADD SENDER INFO. TO ID FOR USE AS SEARCH WORD
38
WAS DATE ADDRESSEE FOUND ?
N
Y
42
FLAG FOR MANUAL REVIEW FOR ADDRESSEE ADD & STORE IN CODE
40
CHOOSE DATE & ADDRESSEE AS SEARCH WORDS. ADD TO ID
44
TRANSMIT IMAGE OR NOTE ABOUT REC'D DOCUMENT TO ADDRESSEE (E-MAIL)
46
WAS SENDER INFORMATION FOUND ?
Y
N
48
CHOOSE SENDER INF AS SEARCH WORDS. CONVERT & STORE CORRELATED WITH ID
50
OCR CONVERSION PROBLEM ?
Y
N
52
STORE INDEX INFO. FLAG FOR HUMAN REVIEW
54
MACHINE SELECT SEARCH WORDS FROM REST OF DOCUMENT TEXT LANGUAGE DEP PROCESS (FIG. 3)
56
HUMAN REVIEW OF REASONS FOR OCR PROBLEM, CORR. & RETRY OR MANUAL ENTRY
58
CONVERT & STORE CHOSEN SEARCH WORDS WITH ID & STORE IMAGE
60
MORE DOCUMENTS TO BE PROCESSED ?
Y
N
1
END

FIG. 1


ENTER PRE-RUN INFORM.
62
1
61
FEED DOCS TO SCANNER, SCAN & PRINT ID NO.
68
DOCUMENTS
FIG. 2
CONVERT & STORE ENTIRE DOCUMENT IN RAM
63
OCR CONVERSION PROBLEM ?
65
STORE INFO. FLAG FOR HUMAN REVIEW
66
SEARCH FOR SENDER INFORMATION
72
HUMAN REVIEW OF OCR PROBLEM, RETRY, MAN. ENTRY
67
BUFFER STORE IMAGE (RAM) & STORE ID IN CODE
64
78
SEARCH IMAGE FOR LOGO
82
(MANUAL) ADD LOGO IMAGE TO LOGO TABLE WITH ID AND SENDER COMPANY INFORMATION
76
LOGO TABLE
74
WAS A LOGO PATTERN FOUND ?
Y
75
COMPARE LOGO PATTERN WITH STORED TABLE OF LOGO PATTERNS
78
LOGO FOUND IN LOGO TABLE ?
N
Y
N
84
WAS DATE, ADDRESSEE FOUND ?
87
FLAG FOR MANUAL REVIEW FOR ADDRESSEE ADD & STORE IN CODE
88
ADD SENDER INFO. TO ID FOR USE AS SEARCH WORD
86
CHOOSE DATE & ADDRESSEE AS SEARCH WORDS, ADD TO ID
88
TRANSMIT IMAGE OR NOTE ABOUT REC'D DOCUMENT TO ADDRESSEE (E-MAIL)
90
WAS SENDER INFORMATION FOUND ?
Y
92
CHOOSE SENDER INFORMATION & SEARCH WORDS, STORE CORRELATED WITH ID
N
MACHINE SELECT SEARCH WORDS FROM REST OF DOCUMENT TEXT LANGUAGE DEP PROCESS (FIG. 5)
94
STORE CHOSEN SEARCH WORDS WITH ID, MASS STORE DOC. IN CODE
96
MORE DOCUMENTS TO BE PROCESSED ?
98
Y
1
N
END

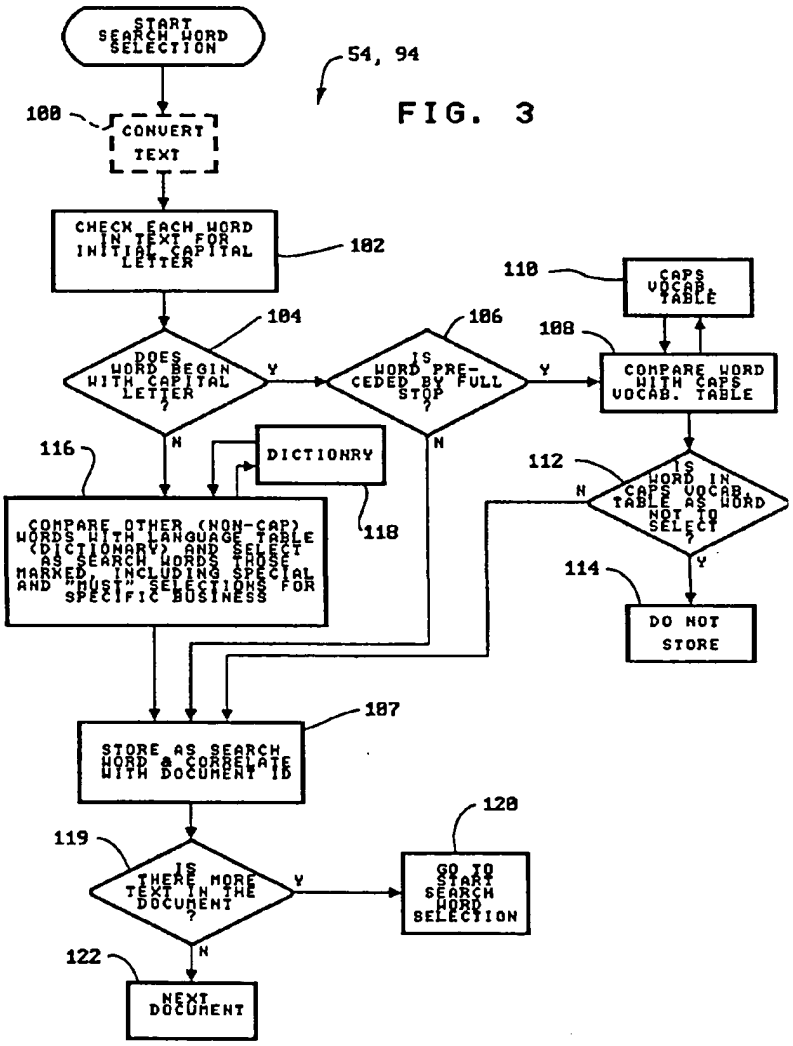

START SEARCH WORD SELECTION
54, 94
100
CONVERT TEXT
CHECK EACH WORD IN TEXT FOR INITIAL CAPITAL LETTER
102
104
DOES WORD BEGIN WITH CAPITAL LETTER ?
Y
N
106
IS WORD PRE-CEDED BY FULL STOP ?
Y
N
110
CAPS VOCAB. TABLE
108
COMPARE WORD WITH CAPS VOCAB. TABLE
112
IS WORD IN CAPS VOCAB. TABLE AS WORD NOT TO SELECT ?
N
Y
114
DO NOT STORE
116
DICTIONRY
118
COMPARE OTHER (NON-CAP) WORDS WITH LANGUAGE TABLE (DICTIONARY) AND SELECT AS SEARCH WORDS THOSE MARKED, INCLUDING SPECIAL AND "MUST" SELECTIONS FOR SPECIFIC BUSINESS
107
STORE AS SEARCH WORD & CORRELATE WITH DOCUMENT ID
119
IS THERE MORE TEXT IN THE DOCUMENT ?
Y
N
120
GO TO START SEARCH WORD SELECTION
122
NEXT DOCUMENT

FIG. 3

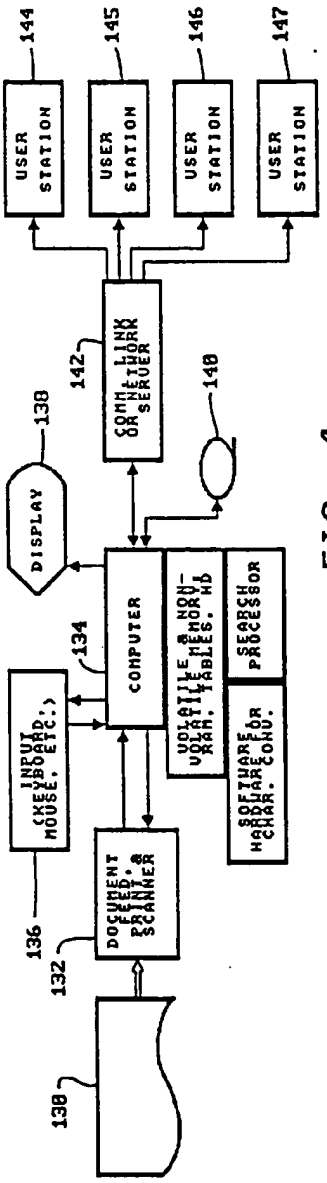
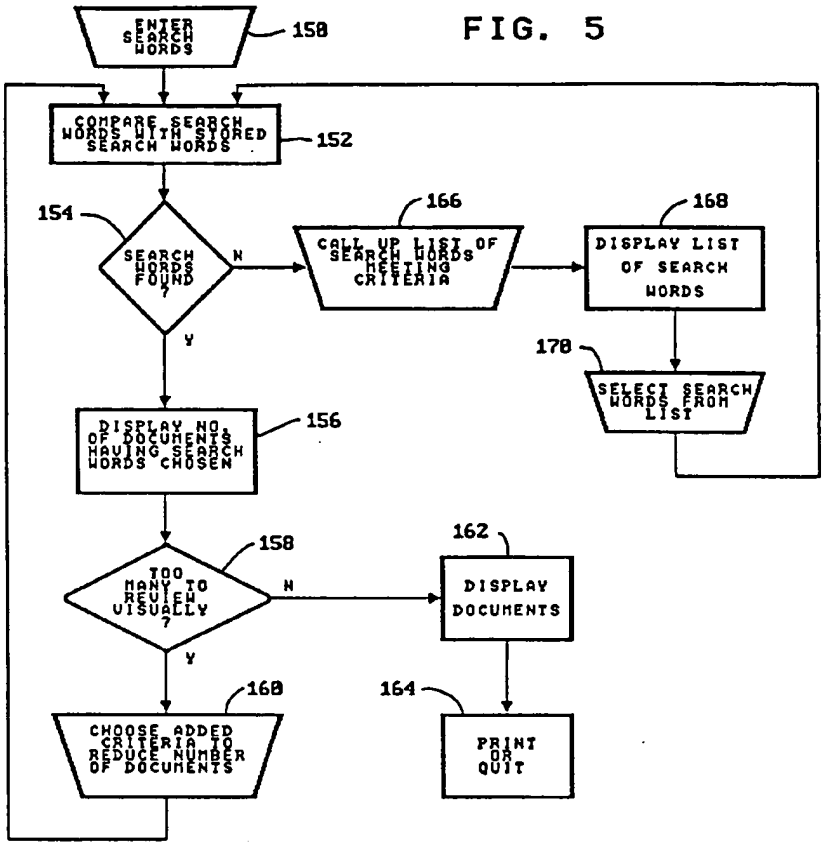

144
145
146
147
USER STATION
USER STATION
USER STATION
USER STATION
142
COMM. LINK OR NETWORK SERVER
140
138
DISPLAY
134
COMPUTER
VOLATILE & NON-VOLATILE MEMORY, HD
SEARCH PROCESSOR
SOFTWARE HARDWARE CHAR. COND.
INPUT (KEYBOARD, MOUSE, ETC.)
136
DOCUMENT FEED, PRINT, & SCANNER
132
138

FIG. 4

FIG. 5


ENTER SEARCH WORDS
150
COMPARE SEARCH WORDS WITH STORED SEARCH WORDS
152
154
SEARCH WORDS FOUND ?
N
Y
166
CALL UP LIST OF SEARCH WORDS MEETING CRITERIA
168
DISPLAY LIST OF SEARCH WORDS
170
SELECT SEARCH WORDS FROM LIST
DISPLAY NO. OF DOCUMENTS HAVING SEARCH WORDS CHOSEN
156
158
TOO MANY TO REVIEW VISUALLY ?
N
Y
162
DISPLAY DOCUMENTS
164
PRINT OR QUIT
168
CHOOSE ADDED CRITERIA TO REDUCE NUMBER OF DOCUMENTS

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(54) Mass document storage and retrieval system.

(57) A sequence of documents is delivered to an optical scanner in which each document is scanned to form a digital image representation of the content of the document. In one embodiment, the image representation is converted into code (ASCII) and is automatically examined by data processing apparatus to select search words which meet predetermined criteria and by which the document can subsequently located. In another embodiment, the image is not converted. The search words are stored in a non-volatile memory in code form and the entire document content is stored in mass storage, either in code or image form. Techniques for selecting the search words are disclosed.

EP 0 465 818 A3

European Patent Office

EUROPEAN SEARCH REPORT

Application Number

EP 91 10 8916

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
X	EP-A-0 170 469 (SMITHSONIAN INSTITUTION) 5 February 1986 * page 1, line 1 - line 9; figure 1 * * page 4, line 32 - page 8, line 1 * * page 9, line 14 - line 32 *	1,3,6,8, 9,13-15, 19,20, 24-27	G06F15/403 G06F15/40
X	EP-A-0 251 237 (WANG LABORATORIES) 7 January 1988 * abstract; claim 1; figures 2,4,7,8,11 * * column 10, line 5 - line 21 * * column 5, line 1 - line 32; figure 6 * * column 13, line 36 - line 37 *	1-3,6, 10, 13-15, 21,24-27	
A	WO-A-8 404 864 (FRÖSSL; DURRER) 6 December 1984 * abstract * * page 8, line 1 - line 5 * * page 16, line 21 - page 19, line 4 *	1,2,10, 13,14,21	TECHNICAL FIELDS SEARCHED (Int. Cl.5)
A	EP-A-0 202 671 (HITACHI) 26 November 1986 * page 25, line 12 - line 22; claims 1,4-8; figures 7,10A,11,12 *	1,7,10, 13,18,21	G06F
A	US-A-4 610 025 (E. BLUM; W. PIERCE) 2 September 1986 * column 4, line 48 - column 7, line 16 * * column 8, line 41 - line 66 *	5,11,12, 17,22,23	

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	11 NOVEMBER 1992	GRANGER B.D.

CATEGORY OF CITED DOCUMENTS

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D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

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TO BUSINESS AND TECHNOLOGY EDITORS:

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HERNDON, Va., Aug. 27 /PRNewswire/ -- DCR, a unit of Network Imaging Corporation (NIC) (Nasdaq-NNM: IMGX), today announced the successful installation of TREEV/Plus(TM) with IBM's AS/400 RISC 500 series computer at Tennessee State Bank in Pigeon Forge, Tennessee. Tennessee State Bank is one of the largest community banks in Tennessee, with an asset base of $225 million and over 25,000 customers. With over 2,400 client/server document management and retrieval software installations worldwide, DCR is the leading provider of optical storage and retrieval software to the community banking market.

TREEV/Plus is DCR's newest COLD (computer output to laser disk) system that interfaces with IBM's AS/400 series midrange host. Report data is stored on a 5 1/4 inch optical drive.

Tennessee State Bank's decision to upgrade its computer system stems from increasing local competition and the bank's need to better position itself to take advantage of Pigeon Forge's booming tourist industry. According to Tammie Sutton, vice president of data processing at Tennessee State Bank, "Banking has really become a technology-driven industry. The TREEV/Plus system has not only increased our bank's operational efficiency, but it is also helping us provide the type of customer service and document search capabilities we need to stay competitive in this market." Tennessee State Bank uses TREEV/Plus to store banking reports such as demand deposits, savings account information, certificates of deposit, loan documents and customer statements.

With the Pigeon Forge area experiencing tourism growth of over 30% in 1995 alone, local chamber of commerce and banking officials are witnessing a corresponding increase in amusement and lodging construction as well as other commerce-related activities. Tennessee State Bank is confident that with their new IBM AS/400 RISC 500 series computer and the TREEV/Plus software in place, they will be able to capture a significant share of Pigeon Forge's $500,000,000 a year tourism market.

"Our staff couldn't be happier," Sutton added. "We would recommend TREEV/Plus to any business. So much information is housed on optical disks that a couple of keystrokes produce enormous amounts of information. Our bank can produce years' worth of statements in just a few moments." The TREEV/Plus installation is also saving Tennessee State Bank a lot of money. Instead of spending $5,000 on paper to store six months of banking statements, the bank is now able to store this information on a single $125 optical disk.

Brian Hajost, senior vice president at Network Imaging, echoes Tammie Sutton's enthusiasm for this technology. According to Hajost, "DCR has evolved into the type of technology provider that a bank can look to for< advice before facing a costly conversion. Most banks don't realize it but the archival value of its COLD reports and document images are probably the bank's greatest asset. DCR is here to protect that investment."

About TREEV/Plus

TREEV/Plus is a client/server document storage and retrieval application that provides fast access and retrieval to mission-critical reports and data. TREEV/Plus gathers, indexes, compresses and stores report data on Write-Once, Read-Many (WORM) optical cartridges. It effectively replaces the use of paper, microfilm and microfiche as a storage medium.

Other TREEV products include the TREEV Enterprise(TM) Series: TREEV Explorer, a Windows(R)-based client/server document storage and retrieval application and TREEV Voyager(TM), a document imaging system that captures and stores images from any scanned or faxed document. Together the TREEV Enterprise Series forms an advanced integrated data and document management solution. TREEV installations start at around $15,000.

About DCR and Network Imaging Corporation

DCR, a unit of Network Imaging Corporation (NIC) (Nasdaq-NNM: IMGX), develops and markets the TREEV family of COLD and imaging products. DCR is recognized as a leading provider of innovative COLD and imaging solutions to the banking community. For additional information about DCR products, please call 800-229-5430 or 612-854-6109 or visit the DCR Web site at http://www.dcr-online.com.

Network Imaging Corporation (NIC) develops and markets multimedia, engineering document management, workflow and COLD (computer output to laser disk) software. For additional information about NIC's products, please e-mail nicinfo netimage.com, call 800-254-0994, or visit the NIC Web site at http://www.netimage.com.

SOURCE Network Imaging Corporation

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(IMGX)

COMPANY NAME: NETWORK IMAGING CORPORATION; DCR; TENNESSEE STATE BANK
TICKER SYMBOL: IMGX (NDQ); IMGX (NDQ); IMGX (NDQ)
PRODUCT: COMPUTER, ELECTRONICS (CPR); INTERNET, MULTIMEDIA, ONLINE (MLM); BANKING, FINANCIAL SERVICES (FIN)
STATE: TENNESSEE (TN); VIRGINIA (VA)
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Small brokerage helped by electronic imaging, printing

Hoffman, Thomas

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ABSTRACT: Meeting SEC regulations that require stock market players to settle securities transactions within 3 days has become a challenge for IS managers at many brokers/dealers. Ernst & Co. has positioned itself to meet the pending regulations by implementing a workgroup imaging and distributed printing systems.

TEXT: By June 1, 1995, U.S. stock market players will be required to settle securities transactions within three days (T+3) instead of five due to Securities and Exchange Commission regulations designed to improve the industry's ability to manage credit and risk.

While meeting the T+3 deadline has become a challenge for information systems managers at many broker/dealers, Ernst & Co. in New York has positioned itself to meet the pending regulations by implementing workgroup imaging and distributed printing systems.

Ernst & Co.'s distributed printing system, from Automatic Data Processing, Inc.'s (ADP) Investor Communications Services and Output Technologies, was designed to generate transaction confirmations within 24 hours. As part of the T+3 regulations, broker/dealers will be required to send such written confirmation to their customers on or before the settlement date.

Trouble for the little guys

That is usually not a problem for brokerage giants such as Merrill Lynch & Co., which can typically cover up to 90% of its customers' transactions with asset management capital it has set aside. However, this has become more of a critical issue for smaller brokerages that lack the assets to back their customers' transactions.

"The smaller brokers are having the biggest problem adjusting to T+3, particularly those who are trying to process transactions solely with in-house systems," said Hal McIntyre, a managing partner at The Summit Group, a Murray Hill, N.J.-based management consultant for securities processing firms. But, as McIntyre pointed out, smaller firms that rely on service bureaus such as ADP's Investor Communications Services unit are starting to benefit from a recent influx of products.

Ernst & Co., which clears 5,000 to 12,000 transactions a day for 70 broker/dealers, became an early user of Rapid Confirm, a distributed electronic printing system, and went live with the system in March. In the

past, staffers in Ernst & Co.'s mail room would stuff thousands of transaction confirmations into envelopes each day and mail them out to clients.

Now, Ernst & Co. processes transactions on any one of its 200 image-enabled IBM ValuePoint PCs using MicroBank Software, Inc.'s System for Transaction Optical Retrieval Query Manager, a Windows-based package that indexes and retrieves data from write-once read-many technologies where customer statements are stored.
The files are routed from the IBM ValuePoints over an IBM Token Ring LAN network running Novell, Inc.'s NetWare 3.12 network operating system and transmitted over leased-line connections to ADP's brokerage network. Once there, the information is batch-processed and forwarded over T1 connections to the Output Technologies unit.

The data is then reprocessed into an electronic forms format by Output Technologies and transmitted to one of six regional operating centers around the country. The statements are printed, inserted and mailed through the U.S. Postal Service.

Newfound efficiency

The entire Rapid Confirm delivery process takes less than 24 hours. Before, it often took days before Ernst & Co.'s confirmations were mailed to customers. "We were in the Dark Ages--it wasn't economically efficient, and we weren't making good use of our time," said Mitch Miesler, Ernst & Co.'s vice president of marketing.

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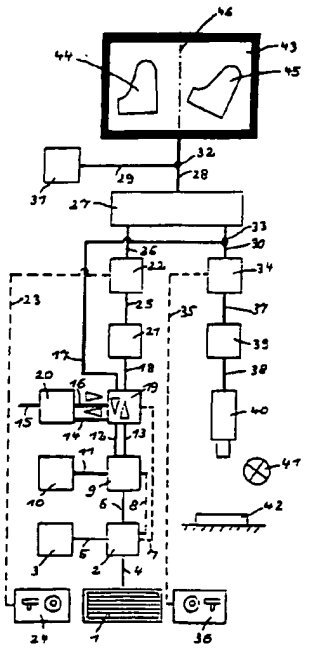
(54) Mustervergleichs- und Speichereinrichtung

(57) Die Erfindung ermöglicht es, aus einer großen Anzahl auch einander stark ähnelnder geometrischer Objekte und Muster schnell und erschöpfend derartige Objekte oder Muster herauszufiltern, wie sie ein damit zu vergleichendes Objekt bzw. Muster aufweist.
Bei den Objekten kann es sich beispielsweise um Lagerartikel oder kriminaltechnische Spuren handeln.
Die Lösung erfolgt durch ein zweistufiges Selektionsverfahren, wobei die erste Stufe eine Grobselektion und die zweite Stufe eine Feinselektion darstellt. Die Grobselektion erfolgt automatisch mittels Computer-Datenbank unter Ausschöpfung alphanumerisch erfaßbarer Objekt- bzw. Mustereigenheiten, beispielsweise Abmessungen.
Die Feinselektion erfolgt visuell mittels Videoeinrichtung unter Ausschöpfung von Strukturen der Objekte oder Muster, indem aus einem Bildspeicher abgerufene Bilder der Objekte bzw. Muster beliebig auf einem Monitor positioniert, gedreht, gestreckt, gestaucht, vergrößert, verkleinert, überlagert und gespiegelt und so optimal mit einem auf dem gleichen Monitor abgebildeten Objekt oder Muster visuell verglichen werden können.
Die Einsteuerung der alphanumerisch vorselektierten Objektbilder bzw. Muster in die Videoeinrichtung erfolgt automatisch mittels eines von dem Computer gesteuerten, codierbaren Kreuzschienenverteilers.



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Beschreibung

Es sind Mustervergleichseinrichtungen bekannt, die aus zwei Videokameras, einem Bildmischer und einem Monitor bestehen. Der Vergleich zweier Muster miteinander kann so durch deren Anordnung nebeneinander auf dem Bildschirm oder durch Überlagerung der Muster miteinander erfolgen, indem die Objekte vor den Kameras entsprechend positioniert werden oder die Kameras entsprechend verschoben und um ihre optische Achse gedreht werden.

Zwecks Personen-Zugangskontrolle sind Bildspeicheranlagen bekannt, bei denen mittels einer Codekarte oder sonstiger Eingabe alphanumerischer Daten ein Bild der Person aus einem Bildspeicher auf einen Monitor gerufen wird. Der Vergleich erfolgt mittels Livebildes von einer Videokamera, dargestellt auf einem zweiten Monitor. Verschiebung und Drehung der Bilder sind hier nicht erforderlich, da die Objekte stets lagerichtig abgebildet werden.

Für Selektionszwecke sind Computer-Datenbankprogramme für alphanumerische Daten bekannt, die auf einfache Weise nach der Installation einmalig an die Bedürfnisse des Anwenders angepaßt werden. Sie gestatten auch UND-Verknüpfungen, d. h. der Anwender gibt vor, daß nur Objekte recherchiert werden sollen, die mehrere bestimmte Eigenschaften geometrischer oder sonstiger Art aufweisen. Für zum Beispiel geometrische Größen können für die Abfrage auch Toleranzbänder vorgegeben werden. Es können auch Segmentabfragen erfolgen, das heißt, auch lückenhafte Datensätze werden bei der Abfrage erfaßt.

Der Erfindung lag die Vorgabe zugrunde, eine Einrichtung zu schaffen, mit der es möglich ist, aus einer großen Anzahl einander zum Teil stark ähnelnder, mit zum Teil nur wenig signifikanten Merkmalen ausgerüsteter, hinsichtlich ihrer Lage nicht definierbarer Objekte bzw. Muster schnell und erschöpfend Objekte mit gleichem oder ähnlichen, zwei- oder dreidimensionalem Muster herauszufiltern, wie es ein damit zu vergleichendes Objekt aufweist.

Die Aufgabe wurde erfindungsgemäß dadurch gelöst, daß eine Feinselektion durch visuellen Vergleich der Muster auf einem Monitor erfolgt, wobei die Bilder der Objekte vorher in einem Bildspeicher archiviert worden sind und sowohl diese Archivbilder als auch ein Bild des zu vergleichenden Objekts auf dem Monitor beliebig verschoben, gedreht, geschwenkt, gespiegelt, vergrößert, verkleinert und einander überlagert werden können.

Der visuellen Feinselektion kann eine alphanumerische Grobselektion vorgeschaltet sein, wobei zum Beispiel geometrische Daten und sonstige Besonderheiten des Objektes genutzt werden. Die alphanumerische Grobselektion kann mittels externen Computers oder mittels eines Computers erfolgen, der in die Anlage integriert ist und dann gleichzeitig Steuerfunktionen übernimmt. Bei Verwendung eines externen Computers können die bei der Grobselektion ermittelten Objektnummern bzw. Bildnummern mittels Datenträgers, z. B. mittels Diskette, an den Bildspeicher übergeben werden.

Zwecks Vereinfachung der Vorrichtung kann die Einrichtung zur elektronischen Bildveränderung des aktuellen Objekts fehlen und statt dessen das Objekt auf einem Kreuztisch mit Drehteller bewegt werden.

Der visuelle Vergleich kann auch stereoskopisch erfolgen, indem dann von zwei nach Art eines Stereoskops auf das Objekt gerichteten Videokameras nacheinander

je ein Bild gespeichert wird und diese Bilder dann zusammen mit zwei Bildern des aktuellen Objekts auf zwei im Augenabstand angeordneten Monitoren dargestellt werden, die Einrichtung also zum Teil zweifach vorhanden ist.

Im folgenden wird die Erfindung anhand der **Fig.** 1 bis 3, dazu 2 Blatt Bilderklärungen, erläutert:

Fig. 1

Die genannte alphanumerische Grobselektion mittels der Computertastatur (1), des Computers (2) und des Datenspeichers (3) selbst ist bekannt und nicht Gegenstand der Erfindung. Es sei jedoch erwähnt, daß mittels eines in dem Computer installierten und an die speziellen Bedürfnisse des Anwenders angepaßten Datenbankprogramms, beispielsweise des bekannten Programms "F&A 4.0" auch dann eine Abfrage bzw. Recherche von Datensätzen möglich ist, wenn die Abfrage-Datensätze lückenhaft sind (Segmentabfrage) und wenn numerische Feldinhalte, zum Beispiel Abmessungen des Objektes, toleranzbehaftet sind. Ferner sind zum Beispiel UND-Verknüpfungen verschiedener Feldinhalte des Datensatzes möglich, so daß in Anpassung an die jeweiligen Gegebenheiten ein jeweils guter Kompromiß zwischen hoher Trennschärfe bei der Recherche und einer hohen Wahrscheinlichkeit des Auffindens aller in Frage kommenden Datensätze möglich ist.

Als neu wird hingegen betrachtet, daß von einem selektionsfähigen Programm ein Bildspeicher (9; 10) und eine Kreuzschiene (19) gesteuert werden, so daß nach Eingabe eines — evtl. lückenhaften und toleranzbehafteten — Datensatzes auf dem Monitor (43) auf jeweiligen Tastendruck nacheinander Bilder erscheinen, die dem eingegebenen Datensatz entsprechen. Eine Feinselektion geschieht dann visuell dadurch, daß die Archivbilder mittels des Effektgerätes (22) beliebig verschoben, gedreht, gestreckt, gestaucht, geschwenkt, gespiegelt, vergrößert und verkleinert werden können. Dies geschieht vorteilhaft mittels Joysticks an einem günstig plazierten Steuerpult (24), das mittels Steuerleitung (23) mit dem Effektgerät (22) verbunden ist. Derartige Effektgeräte sind in Videostudios üblich. Gleiches geschieht mit dem aktuellen Bild. Der Bildmischer (27) bietet vorteilhaft die beiden Einstellungen "zwei Halbbilder" und "Bildüberlagerung". Bei Einstellung "zwei Halbbilder" lassen sich an der Bildtrennlinie beliebige Strukturen der beiden Bilder positionieren und so gezielt vergleichen. Bei Einstellung "Bildüberlagerung" lassen sich bevorzugt Konturen bzw. Umrisse vergleichen.

Bei der Bildeingabe bzw. Archivierung wird die dem Objekt zugeordnete Kennummer mittels der Tastatur (1) und des Datenbankprogramms in den Prozessor (9) des Bildspeichers übertragen, gleichzeitig werden die dem Objekt zugehörigen alphanumerischen Daten — soweit vorhanden — von dem Programm in den Computerspeicher (3) geladen, ferner wird über eine der Steuerleitungen (7) die Kreuzschiene entsprechend geschaltet und über die andere Steuerleitung (8) der Bildspeicher auf "Aufnahme" geschaltet.

Fig. 2

Auf der linken Monitorseite ist ein Bild (44) aus dem Bildspeicher so plaziert, daß es teilweise verschwunden ist. Rechts ist das Bild (45) eines aktuellen Objekts mittels des Kreuztisches mit Drehteller (47) so positioniert, daß es teilweise verschwunden ist. Vergleichen lassen

sich so zum Beispiel eventuelle, scheinbar durch die Bildtrennlinie hindurchlaufende Oberflächenmuster bzw. Oberflächenstrukturen. Bei Umschaltung des Videomischers auf Bildüberlagerung kann zum Beispiel geprüft werden, ob die Umrisse der Objekte gleich sind.

Fig. 3

Diese Ausführung für stereoskopische Betrachtung stellt – in Teilen – eine Verdoppelung der Bauteile von Fig. 2 dar. Der Kreuzschienenverteiler ist dabei so programmiert, daß bei der Bildspeicherung nacheinander das Bild von der linken Kamera (56) und das Bild von der rechten Kamera (57) gespeichert werden und bei dem Bildaufruf das linke Speicherbild auf den linken Monitor (51) und das rechte Speicherbild auf den rechten Monitor (55) gelenkt wird.

Beispielhaft ist der Drucker hier an den Kreuzschienenverteiler (19) angeschlossen, so daß er wahlweise das linke oder rechte Archivbild oder das linke oder das rechte Livebild ausdrucken kann.

Zusätzlich können von den Ausgängen der Bildmischer (50) und (55) Bildsignalleitungen zu dem entsprechend codierten Kreuzschienenverteiler (19) führen, so daß dann auch wahlweise zusätzlich das auf dem Monitor (51) oder dem Monitor (55) dargestellte Bild gedruckt werden kann.

Bezugszeichenliste

zu Fig. 1
1 Computertastatur
2 Computer mit Datenbankprogramm
3 Speicher für alphanumerische Daten, zum Beispiel Festplatte
4;5;6 Datenleitungen
7;8 Steuerleitungen
9 Bildspeicher-Prozessor
10 Bildspeicher
11 bis 18 Bildsignalleitungen
19 Kreuzschienenverteiler, matrixförmig codierbar, softwaresteuerbar
20 Bildübertragungssystem für Bild-Fernübertragung
21 Standbildspeicher
22 Effektgerät
23 Steuerleitung
24 Steuerpult mit Joystick
25;26 Bildsignalleitungen
27 Bildmischer
28;29;30 Bildsignalleitungen
31 Drucker
32;33 Verteilerverstärker oder vom Monitor bzw. Bildmischer durchgeschleift
34 Effektgerät
35 Steuerleitung
36 Steuerpult mit Joystick
37;38 Bildsignalleitungen
39 Standbildspeicher
40 Videokamera oder Overheadscanner
41 Beleuchtung
42 aktuelles, zu vergleichendes Objekt
43 Monitor
44 Bild aus dem Bildspeicher
45 Bild des aktuellen Objekts
46 Bildtrennlinie, fehlt bei Überlagerungsmodus

zu Fig. 2
soweit von Fig. 1 abweichend
44 Bild aus dem Bildspeicher (Teilbereich)
45 Bild des aktuellen Objekts (Teilbereich)
47 Kreuztisch mit Drehteller

zu Fig. 3
soweit von Fig. 1 abweichend
29 Bildsignalleitung für je nach Steuerung der Kreuzschiene
– Archivbild, aufgenommen mit der linken Kamera
– Archivbild, aufgenommen mit der rechten Kamera
– aktuelles Bild, aufgenommen mit der linken Kamera
– aktuelles Bild, aufgenommen mit der rechten Kamera
48;49 Standbildspeicher und Effektgerät für Archivbild von der linken Kamera
50;51 Bildmischer und Monitor für Archivbild und aktuelles Bild von der linken Kamera
52;53 Standbildspeicher und Effektgerät für Archivbild von der rechten Kamera
54;55 Bildmischer und Monitor für Archivbild und aktuelles Bild von der rechten Kamera
56;57 Videokameras oder Overheadscanner

Patentansprüche

1. Vorrichtung zum schnellen Vergleich von Lagerartikeln und sonstigen, als zwei- oder dreidimensionale Muster abbildbaren Objekten, bestehend aus einer neuen Kombination mit neuem Zusammenwirken verschiedener, an sich bekannter Gerätem **dadurch gekennzeichnet**, daß geometrische Daten und sonstige Besonderheiten der Objekte nach einem an sich üblichen Klassifikationsschema mittels eines an sich bekannten, selektionsfähigen Datenbankprogramms zusammen mit mindestens einer zu jedem Objekt gehörenden Kennzahl alphanumerisch in einem Computer gespeichert werden, anschließend unter der entsprechenden Kennzahl ein Bild oder mehrere Bilder des Objektes in einem von dem Computer angesteuerten, an sich bekannten Bildspeicher, beispielsweise auf einer WORM-Platte mit hoher Speicherdichte und schnellem Zugriff, digital oder analog gespeichert werden, zwecks Recherche und Vergleichs von dem Operator in an sich bekannter Art unter Beachtung des Klassifikationsschemas geometrische Daten des gesuchten Objektes nebst von dem Datenbankprogramm in an sich bekannter Art verarbeitbaren Toleranzvorgaben dieser Daten und nebst sonstigen Besonderheiten des Objekts mittels Computertastatur eingegeben werden, der Computer die Kennziffern der Objekte, für die diese Kriterien zutreffen, auf Tastendruck nacheinander aus dem Bildspeicher aufruft, der Bildspeicher das Bild in einem an sich bekannten Standbildspeicher gibt, der Standbildspeicher das Bild an ein an sich bekanntes Effektgerät gibt, mittels des Effektgerätes, bevorzugt mittels Joysticks, das Bild bzw. das Objekt horizontal und vertikal verschoben, ferner gedreht, gestreckt, gestaucht, geschwenkt, gespiegelt, vergrößert und verkleinert werden kann, das Bild aus dem Effektgerät in einen Eingang eines an sich bekannten Videomischers gelangt, von einer Videokamera oder einem Scanner das Bild eines zu vergleichenden Objekts ebenfalls über einen Standbildspeicher in ein Effektgerät und von hieraus in den anderen Eingang des Videomischers gelangt, der Videomischer in bekannter Art umschaltbar ist von Betrieb mit zwei Halbbildern auf Betrieb mit

Bildüberlagerung und so das Bild aus dem Speicher mit dem Bild des aktuellen Objekts mittels der Joysticks beliebig zueinander positioniert, verändert und entsprechend auf einem an sich bekannten Monitor angezeigt werden.

2. Vorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß im Signalweg zwischen Bildspeicher-Prozessor und Standbildspeicher ein an sich bekannter, matrixförmig codierbarer Video-Kreuzschienenverteiler mit mehreren Ein- und Ausgängen angeordnet ist, der von dem Computer entsprechend dem zur Bildspeicherung, zum Bildaufruf, zum Empfang externer Bilder und zum Versenden von Bildern erforderlichen Signalweg mit digital codierten Signalen gesteuert wird.

3. Ausführungsform der Vorrichtung nach Anspruch 1 und 2, dadurch gekennzeichnet, daß das Signal von der Videokamera direkt auf den Bildmischer und den Kreuzschienenverteiler gegeben wird und die Lageveränderung des aktuellen Objekts mittels eines an sich bekannten Kreuztisches mit Drehteller erfolgt.

4. Vorrichtung nach Anspruch 1 bis 3, dadurch gekennzeichnet, daß sowohl für das aktuelle als auch für das Speicherbild stereoskopische Darstellung erzielt wird, indem zwei Monitore nach Art von Mikroskopokularen in Augenabstand angeordnet werden, wahlweise mit Okularen ausgerüstet sind, jeder dieser Monitore von einem Bildmischer angesteuert wird, jeweils einer der beiden Bildmischereingänge von je einer Kamera angesteuert wird, die beiden Kameras zwecks Erzielung eines Stereoeffekts als linke und rechte Kamera in einem Winkel zueinander auf das Objekt gerichtet sind, die beiden anderen Bildmischereingänge über zwei synchron arbeitende Effektgeräte von einem linken und einem rechten Bild aus zwei Standbildspeichern gespeist werden, diese Bilder nacheinander aus dem Bildspeicher in die Standbildspeicher eingespeist worden sind, wobei die Kanalisierung auf den linken oder rechten Standbildspeicher mittels der Matrixcodierung von dem Computer erfolgen.

5. Vorrichtung nach Anspruch 4, dadurch gekennzeichnet, daß die Kameras auf die Okulartuben einer Stereolupe montiert sind.

6. Beleuchtungseinrichtung für Vorrichtung nach Anspruch 1, 3, 4 und 5, dadurch gekennzeichnet, daß zwecks Vergleichbarkeit normiertes Licht verwendet wird, zum Beispiel Schräglicht, diffuses Licht, koaxiales Auflicht oder Durchlicht.

7. Gestaltung der Vorrichtung nach Anspruch 1, 2 und 4, dadurch gekennzeichnet, daß mehrere Funktionsgruppen wahlweise in einem Gehäuse zusammengefaßt werden können.

8. Konzeption der Vorrichtung nach Anspruch 1 bis 4, dadurch gekennzeichnet, daß die Bildübertragung in "Echtzeit" erfolgt, wobei Analogtechnik oder Digitaltechnik verwendet wird.

9. Konzeption der Vorrichtung nach Anspruch 1, 2 und 4, dadurch gekennzeichnet, daß zwecks möglichst geringen Speicherbedarfs der Bilder je nach Einsatzgebiet in Schwarzweiß- oder Farbtechnik und mit möglichst geringer Orts- und Schwarzweiß- bzw. Farbauflösung gearbeitet wird.

Hierzu 3 Seite(n) Zeichnungen

– Leerseite –

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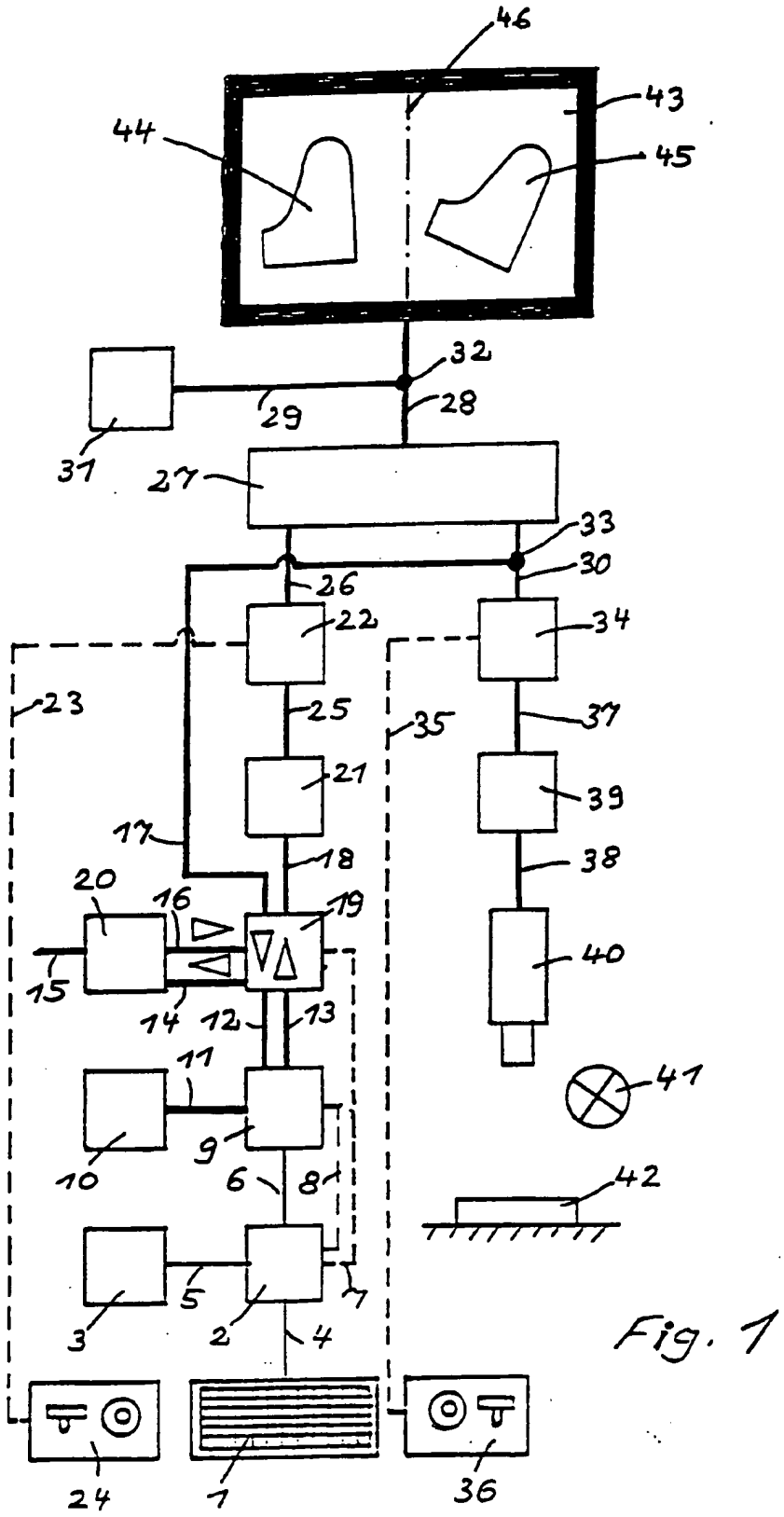

Fig. 1

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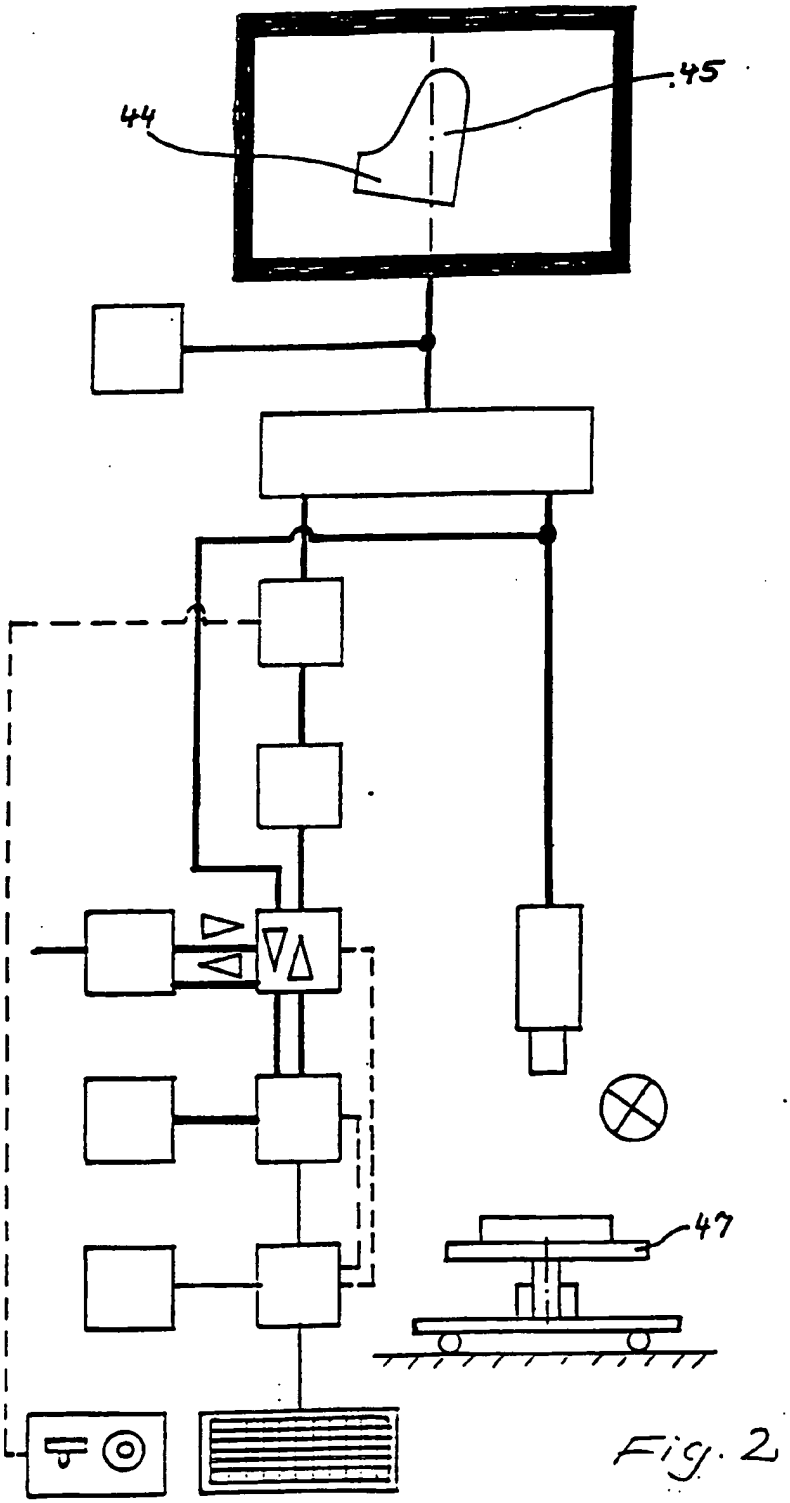

Fig. 2

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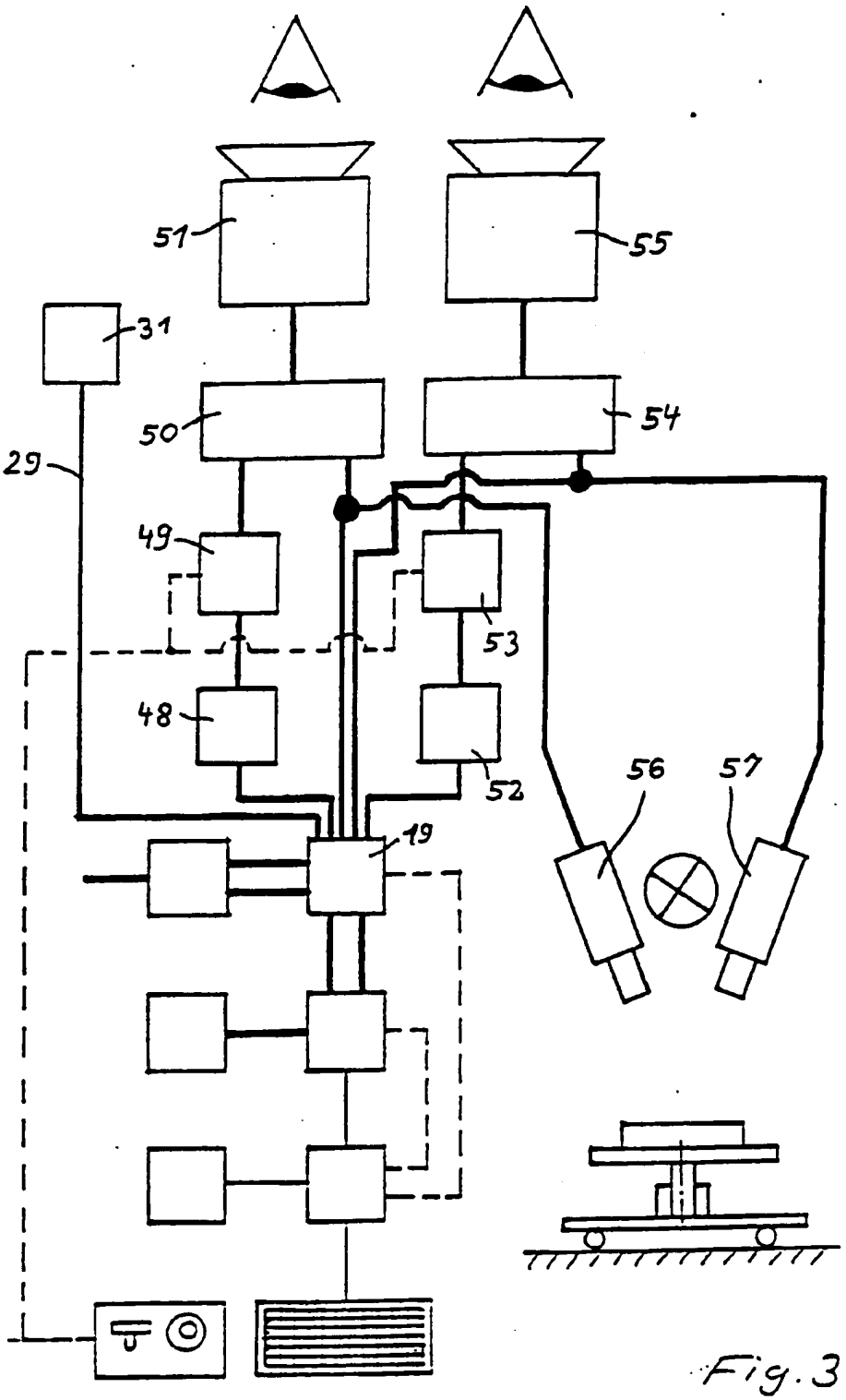

Fig. 3

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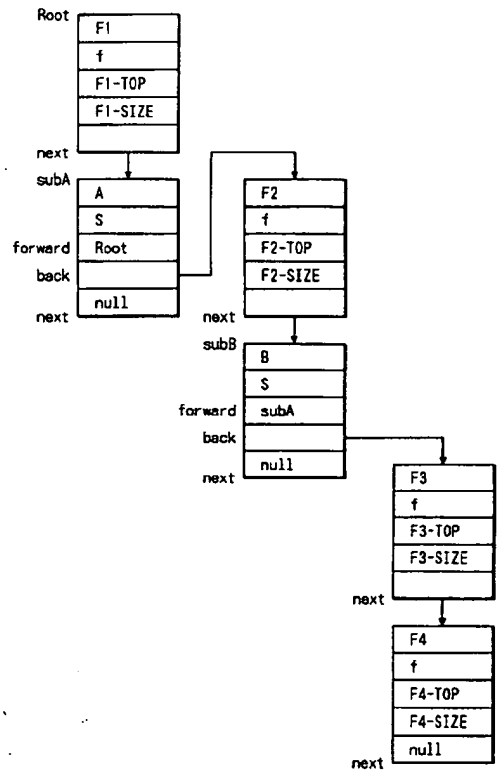
(54) Directory management system.

(57) A directory management apparatus for managing data or a directory using directories, includes a data input unit for inputting data, an attribute information generating unit for generating attribute information indicating a directory to which the data input from the data input unit belongs or a directory to which the directory belongs, and a recording unit for recording the data input from the data input unit, and the attribute information generated by the attribute information generation unit on a recording medium.

FIG. 5



EP 0 487 331 A2

BACKGROUND OF THE INVENTION

Field of the Invention

The present invention relates to a directory management system for managing files recorded on an information recording medium, in which recorded data cannot be rewritten, using hierarchical directories.

Related Background Art

Conventionally, a directory management system is known as a technique for managing data recorded on an information recording medium.

In the directory management system, information called a directory entry for managing a file consisting of a data block is generated, information called a directory as a group of directory entries is recorded, and individual files are managed using the directory.

Conventional file management is performed by recording file information on an information recording medium such as a magnetic disk, in which recorded data can be rewritten, and is performed by a hierarchical directory management system for managing files in a hierarchical structure.

An example of the hierarchical directory management system will be explained below.

In the hierarchical directory management system, directories are dealt like normal files, and files are managed in units of directories.

The uppermost directory is called a root directory, and other lower directories are called sub directories. Furthermore, an upper directory of a given sub directory is called a parent directory.

Fig. 3 shows a model of a hierarchical directory structure.

Fig. 3 illustrates a root directory Root, normal files F1 to F4, and sub directories A and B.

In the root directory, directory entries of the file F1 and the sub directory A are recorded.

In the sub directory A, directory entries of the file F2 and the sub directory B, and directory entries of the root directory as a parent directory of the sub directory A, and the sub directory A itself are recorded.

In the sub directory B, directory entries of the files F3 and F4, and directory entries of the sub directory A as a parent directory of the sub directory B, and the sub directory B itself are recorded.

When an access target is changed from the root directory to the sub directory A, the sub directory A is read out from a recording medium using the directory entry of the sub directory A in the root directory, and a file managed by the directory A is accessed using a directory entry included in the sub directory A.

When an access target is changed from the sub directory A to the root directory, the root directory is read out from the recording medium using the directory entry of the root directory in the sub directory A, and a file managed by the root directory is accessed using a directory entry included in the root directory.

Fig. 9 exemplifies a directory entry format on a magnetic disk.

As shown in Fig. 9, the directory entry format includes, as file information, a file name 501, an attribute 502, position information 503, and a file size 504.

Of these pieces of information, the file name 501 is named by a user to identify a file.

The attribute 502 is information for identifying whether information indicated by a directory entry is a normal file or a sub directory. When the attribute indicates a sub directory, the corresponding directory entry indicates a group of directory entries, i.e., a directory.

The position information 503 is information indicating a position of a magnetic disk where a file begins to be recorded, and the file size 504 indicates an effective byte count of a file.

In the sub directory, the directory entries of a parent directory and the sub directory itself are recorded. Thus, access from a given directory to another directory is enabled, thus realizing a hierarchical directory structure.

In this management system, files are managed in units of directories. When an access target is changed from a given directory to another, the destination directory is read out from an information recording medium using a directory entry of the destination directory.

In this structure, when a directory is edited by, e.g., adding or updating a file, for example, when a new file F5 is added to the sub directory A, a directory entry for managing the file F5 is added to the sub directory A, thus re-recording the entire sub directory A.

When the content of the file F5 is edited, the directory entry for managing the file F5 in the sub directory A is edited, thus re-recording the entire sub directory A.

In this manner, every time a directory entry is edited, all the pieces of information in a sub directory or a root directory including the edited directory entry are re-recorded.

However, when the above-mentioned hierarchical directory management system is executed in an information recording medium, in which recorded data cannot be erased, every time a file is added or edited, a new sub directory or root directory must be added, and directory entries, which need not be edited, must be re-recorded. As a result, many non-edited directory entries are repetitively recorded, and are undesirably left unerased. Thus, an effective recording capacity is decreased, and a directory search time is prolonged.

SUMMARY OF THE INVENTION

It is an object of the present invention to provide

an improved directory management system.

It is another object of the present invention to provide a directory management system, which can effectively utilize a recording area of a recording medium.

It is still another object of the present invention to provide a directory management system, which can shorten a directory search time.

It is still another object of the present invention to provide a directory management system, which is suitable for a recording medium, in which recorded data cannot be erased.

Other objects and features of the present invention will become apparent from the following specification and the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a block diagram showing an arrangement of an information processing apparatus using a directory management system according to an embodiment of the present invention;

Fig. 2 shows a directory entry format in the embodiment shown in Fig. 1;

Fig. 3 exemplifies a model of a hierarchical directory structure in the embodiment shown in Fig. 1;

Fig. 4 shows a table of directory entry data recorded on an information recording medium in the embodiment shown in Fig. 1;

Fig. 5 is a view showing a state wherein directory entries are developed in a hierarchical structure on a memory in the embodiment shown in Fig. 1;

Fig. 6 shows a directory table used when the directory entries are developed in the hierarchical structure in the embodiment shown in Fig. 1;

Fig. 7 is a schematic flow chart showing processing for converting the directory entries into the hierarchical structure in the embodiment shown in Fig. 1;

Fig. 8 is a schematic flow chart showing recording processing in the embodiment shown in Fig. 1; and

Fig. 9 exemplifies a conventional directory entry format used in a magnetic disk.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Fig. 1 is a block diagram showing an arrangement of an information processing apparatus using a directory management system according to an embodiment of the present invention.

The information processing apparatus comprises a CPU 11 for executing various processing operations in this embodiment, a ROM 12 for storing a control program for the CPU 11, and the like, a RAM 13 used as a work area where the CPU 11 executes a control operation, an operation unit 14 used by an operator to input various data, a CRT 15 for making various displays for the operator, a scanner/printer 16 for reading/outputting image information, and an external memory unit 17 for filing various data on an information recording medium such as an optical disk, a hard disk, or the like.

In the information processing apparatus, directory entries for managing corresponding files are independently recorded on the information recording medium. These directory entries are read out to a predetermined area in the RAM 13, and are converted into a hierarchical structure. Thus, an imaginary directory is formed on the predetermined area in the RAM 13, and files can be managed in a hierarchical structure.

Fig. 2 shows an example of the format of a directory entry.

A serial number 101 is information for identifying a given directory entry.

A file name 102 is a name of a file indicated by the directory entry.

An attribute 103 is used for discriminating a type of the directory entry.

Position information 104 indicates a position (e.g., a sector address) of the recording medium where a file managed by the directory entry is recorded.

A file size 105 indicates a size (a used sector count, a byte count, and the like) of a file managed by the directory entry.

Parent information 106 is information for identifying a parent directory of the directory entry.

Fig. 8 is a flow chart for recording data from the external memory unit 17 on a recording medium.

The CPU 11 increments the current serial number by one (step S11), and requests an operator to input a parent directory of a file or directory to be recorded from the operation unit 14 (step S12). If no directory is recorded, a directory called a root directory is defined as the parent directory. The CPU 11 requests the operator to input, from the operation unit 14, an attribute indicating whether data to be recorded is a file or directory. If the input attribute is a file (step S13), file data is read from the scanner/printer 16 or is input from the operation unit 14 (step S14). The CPU 11 requests the operator to input a file name from the operation unit 14 (step S15). The CPU 11 then detects a file size of the input file data (step S16). Furthermore, the serial number, the file name, the attribute, the position information of the file on a recording medium, the file size, and the parent directory are recorded from the external memory unit 17 onto the recording medium (step S17). If there is another data to be recorded, the flow advances to step S11; otherwise, the flow returns to a main program (step S18). If it is determined in step S13 that the attribute is a directory, the CPU 11 requests the operator to input a directory name (step S19), and the serial number,

the directory name, the attribute, and the parent directory are recorded from the external memory unit 17 (step S20). The flow then advances to step S18. In this manner, a file or a directory is recorded.

These pieces of information can be recorded in any order.

Fig. 3 shows a model of a hierarchical directory structure.

Fig. 3 illustrates a root directory Root, normal files F1 to F4, and sub directories A and B.

In this embodiment, pieces of information of the respective directory entries are properly set, so that directories in a hierarchical structure as shown in Fig. 3 can be developed on an imaginary directory development region allocated in a memory (RAM 13).

Fig. 4 shows the directory entries recorded on the information recording medium in the format shown in Fig. 2.

As shown in Fig. 4, the directory entries of the sub directories A and B, the directory entries of the files F1 to F4, and the files F1 to F4 are recorded on the recording medium.

The serial numbers are added to the recorded directory entries in the order of their recording operations, and are used as pieces of parent information indicating parent directories of other directory entries. The serial number of the root directory is defined as 0 although the root directory is not recorded on the information recording medium. Therefore, the serial number "0" of the root directory is recorded in parent information of each of the directory entries of the file F1 and the sub directory A.

An attribute indicates a normal file or a sub directory. When "f" is set in the attribute, it indicates a normal file; when "s" is set, it indicates a sub directory. A directory entry, in which the attribute indicates a sub directory, represents a sub directory name (in this embodiment, A or B) and parent information when data is read out and converted into a hierarchical structure. The directory entries of the sub directories A and B recorded on the recording medium do not include information of lower sub directories or files. For this reason, imaginary directories in a hierarchical structure must be generated on the basis of the directory entries read out from the recording medium.

Furthermore, pieces of position information F1-TOP, F2-TOP, F3-TOP, and F4-TOP respectively indicate the positions of the files F1, F2, F3, and F4 on the recording medium. File sizes F1-SIZE, F2-SIZE, F3-SIZE, and F4-SIZE respectively indicate byte counts of the files F1, F2, F3, and F4.

The position information and the file size are significant only when the attribute indicates a normal file. When the attribute indicates a sub directory, these pieces of information are insignificant.

The directory entries can be written on and read out from the information recording medium one by one. The directory entries are read out in turn from the serial number "1".

In the following description, the directory entries of the sub directories A and B will be referred to as directories A and B, and the directory entries of the files F1 to F4 will be referred to as directories F1 to F4.

Fig. 5 shows imaginary directories obtained by reading out directory entry data (Fig. 4) recorded on the information recording medium, and developing them into a hierarchical structure on the imaginary directory development area in the memory (RAM 13).

In Fig. 5, information "Root" indicates the beginning of directory entry data of the root directory, and information "subA" and information "subB" respectively indicate the beginnings of directory entry data of the sub directories A and B.

"next" is information used for linking directory entries belonging to the root directory or a sub directory, and indicates an address of the linked next directory entry.

Furthermore, "null" indicates that the linked directory entry is the last one.

"forward" and "back" are pieces of information, which are set only when the attribute indicates a sub directory. Information "forward" indicates the start address of a parent directory, and information "back" indicates the start address of a first directory entry belonging to the sub directory.

Fig. 6 shows a directory table used when the directory entry data shown in Fig. 4 are developed onto the memory, as shown in Fig. 5. This directory table is allocated on an area separate from the imaginary directory development area shown in Fig. 5 on the RAM 13.

The directory table stores the serial numbers and start addresses of the root directory and sub directories. The directory table has a function of indicating the start address of a directory corresponding to parent information of directory entry data when the directory entry data is developed, and performing a search operation on the imaginary directory development area.

In an initial state wherein none of directory entries are read out, information "null" indicating that no data is registered in the directory table shown in Fig. 6 is set.

Note that the address of the root directory "Root" on the imaginary directory development area shown in Fig. 5, and the start address of the directory table shown in Fig. 6 are determined in advance.

Fig. 7 is a schematic flow chart showing processing in which the CPU 11 converts directory entries recorded on the information recording medium into a hierarchical structure on the imaginary directory development area.

The directory entries shown in Fig. 4 are read out from the information recording medium in the order of serial numbers, and parent information of each directory entry is read (S1).

The directory table shown in Fig. 6 is looked up on the basis of the predetermined address to search for parent information, i.e., to check whether or not the directory table includes a serial number corresponding to the parent information read in step S1 (S2). If the directory table does not include the corresponding serial number, it is determined that the readout entry data is the first directory entry (S3). The predetermined skip destination address and the serial number "0" of the root directory are stored in the directory table (S3-1).

If it is determined in step S3 that the directory table includes at least one serial number, processing in step S3-1 is omitted.

The serial number on the directory table is searched based on the parent information read out in step S1, and the control skips to the start address of each directory on the imaginary directory development area shown in Fig. 5 on the basis of an address corresponding to the searched serial number (S4). The search operation is continued in the directory already registered on the imaginary directory development area to obtain information indicating a skip destination of the next directory entry (S5). When information "null" indicating the last directory entry is detected, the directory entry is registered on the imaginary direction development area (S6).

Thereafter, the attribute of the directory entry is discriminated. If the attribute indicates a sub directory, the skip destination address of the parent directory of the sub directory is stored in the directory table (S7-1), and the serial number and the skip destination address of the directory entry of the sub directory are stored in the directory table (S7-2).

If it is determined in step S7 that the attribute does not indicate a sub directory, steps S7-1 and S7-2 are omitted.

It is checked if all the directory entries in the recording medium are read out (S8). The above-mentioned processing is repeated from step S1 until all the directory entries are read out.

As described above, the directory entries in the recording medium are sequentially registered on the imaginary directory development area in the RAM 13, thereby generating directories in a hierarchical structure.

The conversion processing will be described in detail below according to the contents of the directory entry data shown in Fig. 4.

The directory F1 corresponding to the serial number "1" is read out (S1). In the directory F1, the attribute indicates a normal file, and parent information is "0". Thus, the serial number "0" is searched from the directory table shown in Fig. 6 (S2).

However, since the directory table stores only information "null", it is determined that the directory F1 is the first directory (S3), and the serial number "0" and information "Root" indicating the beginning of the root directory are stored in the directory table (S3-1).

The directory F1 is registered in the information "Root" on the imaginary directory development area (S4, S5, S6). At this time, information "null" is set in information "next" indicating the skip destination address to the next directory entry.

Since all the directory entries are not read out (S7, S8), the directory A corresponding to the serial number "2" is read out (S1). In the directory A, the attribute indicates a sub directory, and parent information is "0".

The serial number "0" is searched from the directory table (S2), and the control skips to the root directory "Root" on the imaginary directory development area as the skip destination of the serial number "0" (S3, S4). In this case, a search operation is repeated until information "next" of the directory entry in the root directory "Root" becomes "null" (S5). When the information "next" becomes "null", an address of the next directory entry to be registered on the imaginary directory development area is set in this information "next", and the directory A is registered using this address (S6).

In this case, since the attribute of the directory A indicates a sub directory, information "Root" indicating the beginning of the root directory as a parent directory is set in information "forward" (S7, S7-1). Information "null" indicating that no data is registered is set in information "next" for accessing a directory entry belonging to the sub directory A. The address SubA at which the directory A is registered, and the serial number "2" are stored in the directory table (S7-2).

The directory F2 corresponding to the serial number "3" is read out (S1). In the directory F2, the attribute indicates a normal file, and parent information is "2".

The serial number "2" is searched from the directory table (S2). The control skips from the directory table to the address subA as a skip destination of the serial number "2" (S3, S4). Since information "null" is set in information "next" indicating a skip destination to a directory entry belonging to the directory A, it is determined that there is no directory entry belonging to the sub directory A (S5). An address on the imaginary directory development area, where the directory F2 is registered, is set in information "back" of the directory A, and the directory F2 is registered at this address (S6).

When recording operations are performed as described above to register all the directory entries, the hierarchical structure shown in Fig. 5 can be obtained.

In this embodiment, the directory entries are read out from the recording medium one by one. Alternatively, after all the directory entries are read out, they may be converted into a hierarchical structure.

Files can be managed in the hierarchical struc-

ture shown in Fig. 3 using the directories developed on the imaginary directory development area in the RAM 13, as shown in Fig. 5.

More specifically, when an access target is changed from the root directory to the sub directory A, a directory entry is searched from the root directory Root so as to access a file managed by the directory A of the sub directory A.

When an access target is changed from the sub directory A to the root directory, the control can skip to "Root" as the beginning of the root directory on the basis of the information "forward" in the directory entry of the sub directory A, thus realizing access to files managed by the root directory.

In this manner, the directory entries shown in Fig. 4 need only be recorded on the recording medium.

A case will be explained below wherein a file is added or edited. For example, when a file F5 is added below the sub directory A, a directory entry of the file F5, which entry includes an attribute = normal file and parent information = serial number "2" of the sub directory A, is additionally recorded from the external memory unit onto the recording medium. The list of the directory A on the RAM 13 is searched to be linked with the directory B.

When the file F5 is edited, a new directory entry of the file F5 is additionally recorded from the external memory unit onto the recording medium, and the content of a directory F5 on the RAM 13 is edited.

When identical file names are detected upon conversion of directories into a hierarchical structure, a directory having a larger serial number, i.e., a directory recorded later, can be used as a significant directory.

As described above, in this embodiment, since all the directory entries are read and are held on the memory, when an access target directory is changed, the target directory need not be read out from the recording medium again. When a directory is edited, only a directory entry to be edited is recorded, thus shortening a recording time.

In the above embodiment, as information for identifying directory entries, serial numbers added to the directories are used. Information for identifying only a file name or each sub directory may be added, and may be used in identification. Means for converting directories into a hierarchical structure on the basis of attributes and parent information included in the directories is not limited to that of the above embodiment.

According to the present invention, hierarchical directory management can be applied not only to a recording medium, in which recorded cannot be rewritten, but also to a recording medium, in which data can be rewritten.

As described above, when a directory entry is edited by adding or editing a file, the directory entry to be edited need only be re-recorded. In particular, in hierarchical directory management for an information recording medium, in which recorded data cannot be rewritten, a recording capacity can be saved, and a search time can be shortened.

As a storage medium, a write once read many optical disc may be employed. Although the invention is extremely advantageously employed to solve the problem with non-rewritable, non-erasable recording media, it will be realised that it could equally be employed on storage medium which could in principle be rewritten or erased. Our earlier Application EP-A-0286308, incorporated herein by reference, describes an optical card medium and reading and writing thereon.

Claims

1. A directory management apparatus for managing data or a directory using directories, comprising:
   data input means for inputting data;
   attribute information generating means for generating attribute information indicating a directory to which the data input from said data input means belongs or a directory to which said directory belongs; and
   recording means for recording the data input from said data input means, and the attribute information generated by said attribute information generation means on a recording medium.

2. An apparatus according to claim 1, further comprising directory designation means for designating a directory to which the data input from said data input means belongs or a directory to which said directory belongs, and wherein said attribute information generating means generates the attribute information on the basis of the directory designated by said directory designation means.

3. An apparatus according to claim 2, wherein said directory designation means can generate a new directory belonging to said directory.

4. An apparatus according to claim 1, wherein the attribute information indicates attribute information corresponding to the data or said directory to which a directory corresponding to the attribute information belongs.

5. An apparatus according to claim 1, wherein said recording medium is detachable.

6. An apparatus according to claim 1, wherein said recording medium is non-rewritable.

7. An apparatus according to claim 6, wherein said non-rewritable recording medium comprises an

optical recording medium.

8. A directory management apparatus for managing data or a directory using directories, comprising:
reading means for reading data recorded on a recording medium, and attribute data indicating a directory to which the data belongs or a directory to which said directory belongs;
memory means for storing the data and the attribute data read by said reading means; and
development means for hierarchically developing a dependent relationship of the data and said directory on said memory means on the basis of the attribute information stored in said memory means.

9. An apparatus according to claim 8, wherein the attribute information indicates attribute information corresponding to the data or said directory to which a directory corresponding to the attribute information belongs.

10. An apparatus according to claim 9, wherein said development means performs development to indicate a directory to which the data or said directory belongs, and data or a directory dependent on said directory on said memory means on the basis of attribute information indicated by the attribute information.

11. An apparatus according to claim 8, wherein said recording medium is detachable.

12. A directory management method of managing data or a directory using directories, comprising:
the step 1 of inputting data from input means;
the step 2 of causing attribute information generating means to generate attribute information indicating a directory to which the data input in the step 1 belongs or a directory to which said directory belongs; and
the step 3 of recording the data input in the step 1, and the attribute information generated in the step 2 on a recording medium.

13. A method according to claim 12, further comprising the step 1-1 of designating a directory to which the data input in the step 1 belongs or a directory to which said directory belongs, and wherein the step 2 comprises generating the attribute information on the basis of the directory designated in the step 1-1.

14. A directory management method of managing data or a directory using directories, comprising:
the step 1 of causing reading means to read data recorded on a recording medium, and attribute data indicating a directory to which the data belongs or a directory to which said directory belongs;
the step 2 of storing the data and the attribute data read in the step 1 in storage means; and
the step 3 of hierarchically developing a dependent relationship of the data and said directory on said memory means on the basis of the attribute information stored in the step 2.

15. A method according to claim 14, wherein the step 3 comprises performing development to indicate a directory to which the data or said directory belongs, and data or a directory dependent on said directory on said memory means on the basis of attribute information indicated by the attribute information.

16. A recording medium used in a directory management apparatus and method of managing data or a directory using directories, comprising:
a first recording area for recording data; and
a second recording area for storing attribute data indicating a directory to which the data belongs or a directory to which said directory belongs.

17. A medium according to claim 16, wherein the attribute information corresponds to the data, and the attribute information and the data can be independently recorded.

18. A medium according to claim 16, wherein said recording medium is non-rewritable.

19. A medium according to claim 18, wherein said non-rewritable recording medium comprises an optical recording medium.

20. Apparatus for recording files of information on to a non-rewritable or non-erasable medium, which comprises means for generating a recording signal which includes said file data together with information indicating a parent directory file from which said file will be located in subsequent reading.

21. Apparatus for reading a non-rewritable or non-erasable recording medium upon which information is stored in files, said files including directory files for accessing other said files, characterised in that it comprises means for initially reading from said medium, for each file, data defining a directory file usable for accessing that file, and means for storing, from said directory file indicating data, relationship data defining for each directory file, the files which it accesses, and

means for consulting said store means to access a file.

22. A non-rewritable or non-erasable storage medium comprising a plurality of regions a parameter of which is writable to define information, said information being recorded as a plurality of file records, each file record including data referring to a further file from which the first file may subsequently be accessed.

23. A method of file handling for hierarchically arranged file directories, in which parent directories are used to access daughter directories, charcterised in that file information is stored by storing with a daughther file, information indicating its parent directory and in that stored files are read by initially reading the stored indications of the parent directories, and generating therefrom for each parent directory information indicating its daughter files, whereby files may be added or amended by adding or amending references to parent files without needing to delete or amend references to daughter files.

24. An optical storage medium comprising a card shaped (approximately credit card sized) information carrier including information carrying tracks from which information is optically readable, said medium being non-erasable and/or non-rewritable, characterised in that information is stored thereon in the form of hierarchically arranged files comprising directory files and sub directory files.

FIG. 1

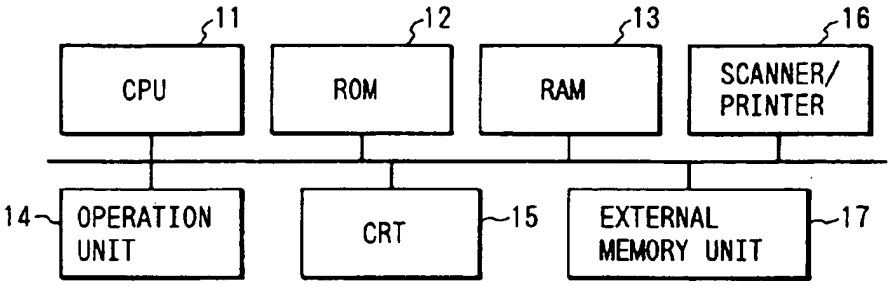


FIG. 2

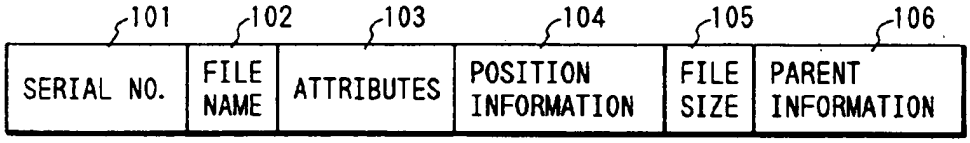


FIG. 3

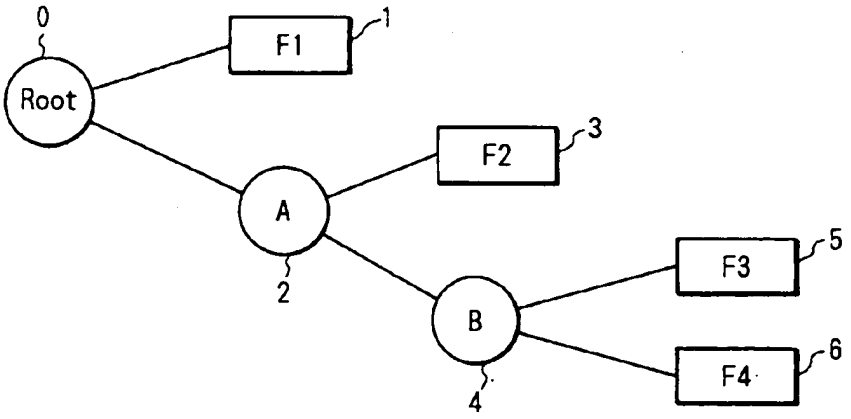


FIG. 4

101 SERIAL NO.	102 FILE MANE	103 ATTRIBUTES	104 POSITION INFORMATION	105 FILE SIZE	106 PARENT INFORMATION
1	F1	f	F1-TOP	F1-SIZE	0
2	A	s			0
3	F2	f	F2-TOP	F2-SIZE	2
4	B	s			2
5	F3	f	F3-TOP	F3-SIZE	4
6	F4	f	F4-TOP		4

FIG. 6

SERIAL NO.	ADDRESS
0	Root
2	subA
4	subB
	null

FIG. 9

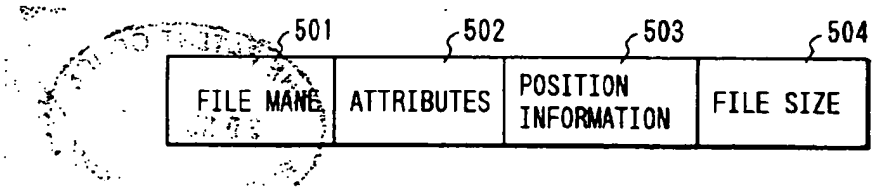


FIG. 5

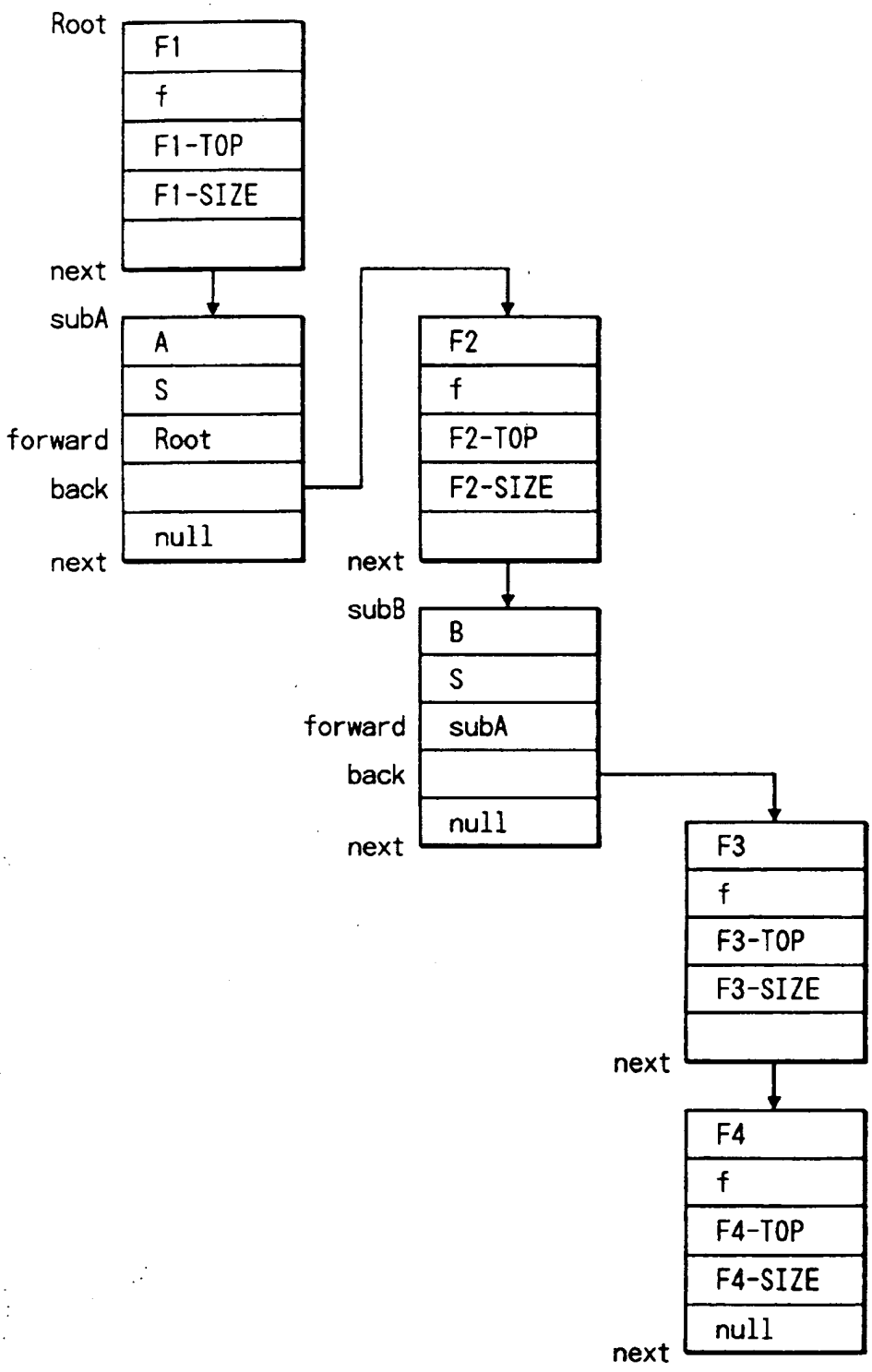

Root
F1
f
F1-TOP
F1-SIZE
next
subA
A
S
forward
Root
back
null
next
F2
f
F2-TOP
F2-SIZE
next
subB
B
S
forward
subA
back
null
next
F3
f
F3-TOP
F3-SIZE
next
F4
f
F4-TOP
F4-SIZE
null
next

FIG. 7

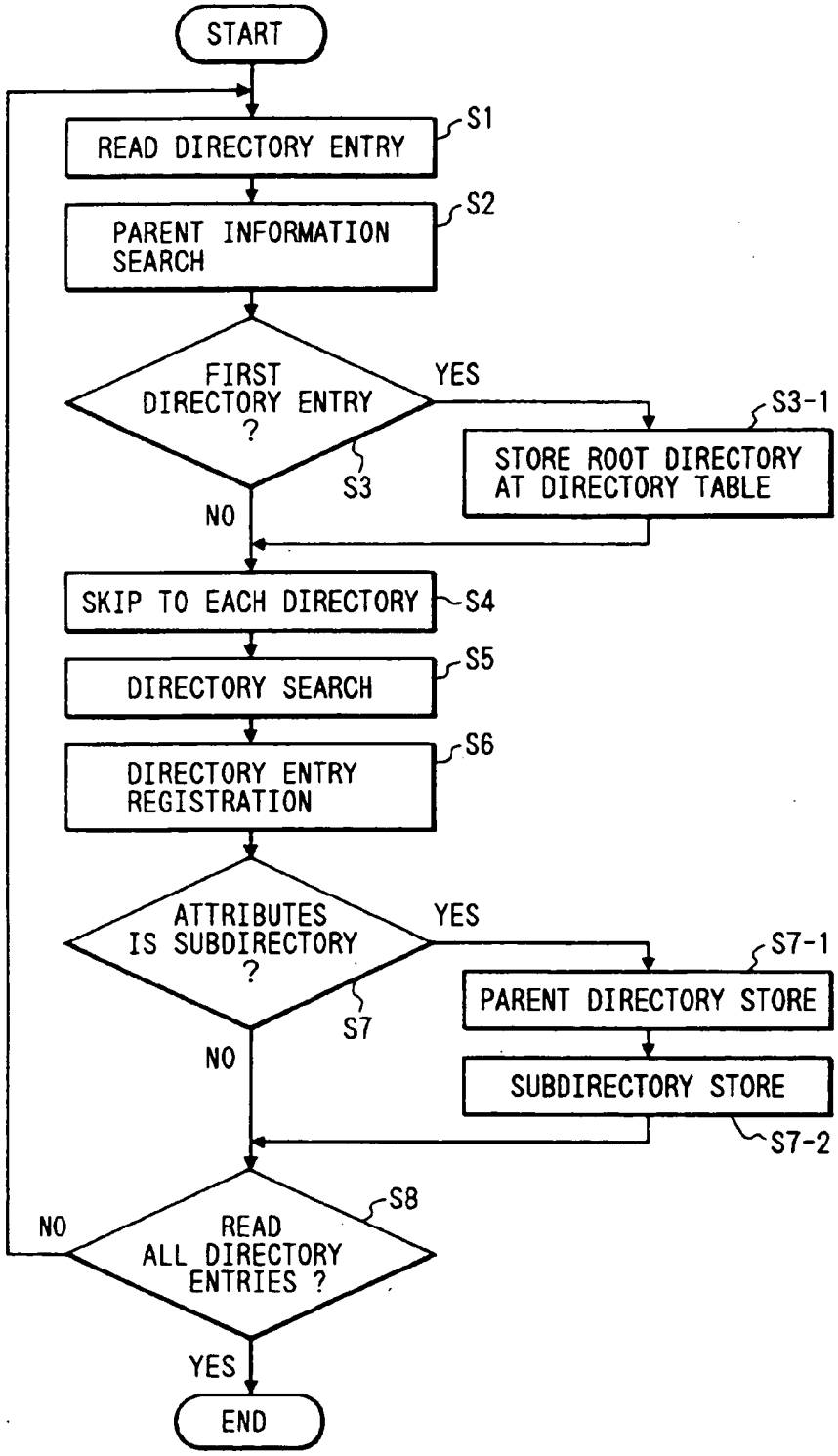
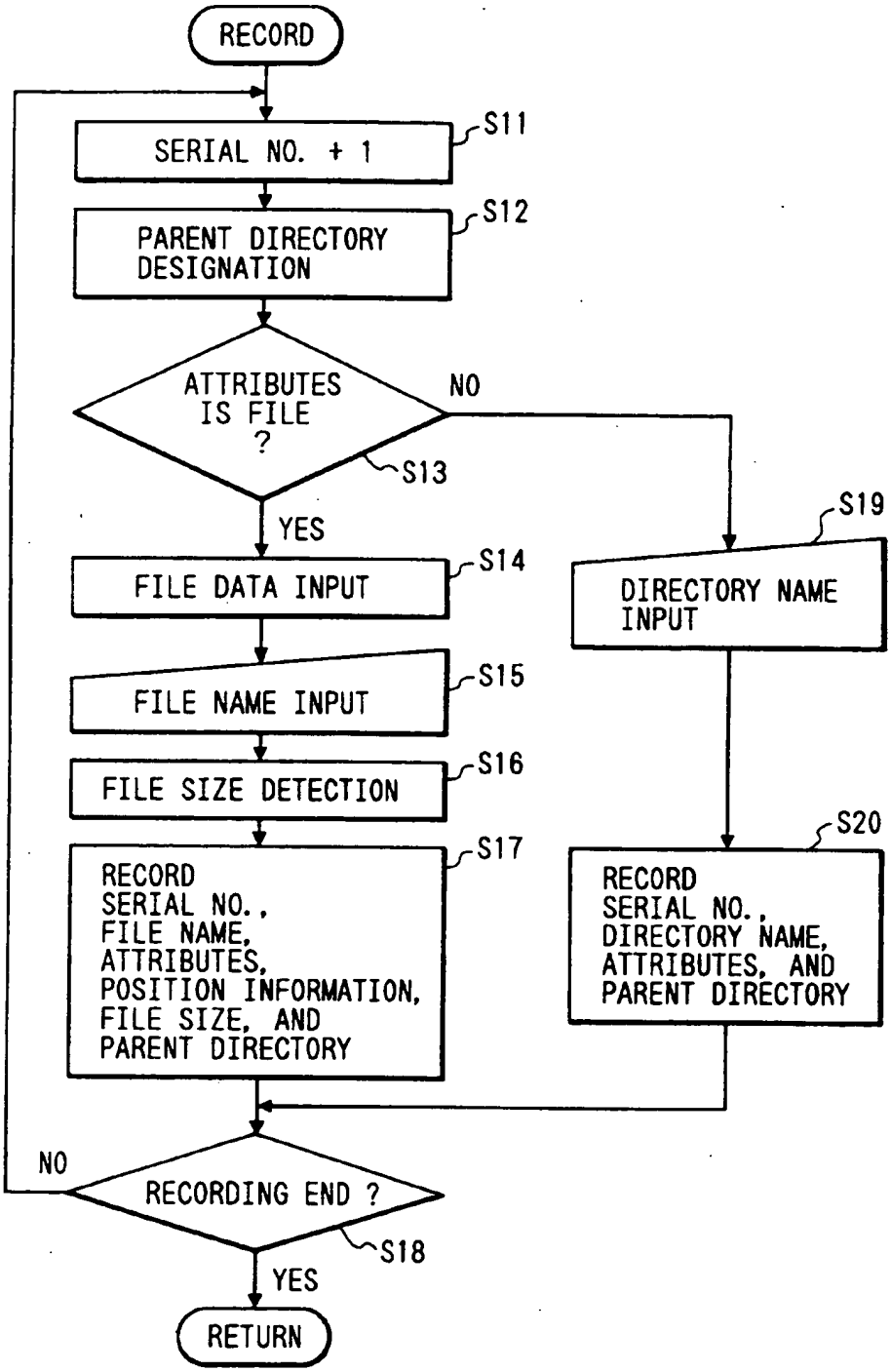

START
READ DIRECTORY ENTRY
S1
PARENT INFORMATION SEARCH
S2
FIRST DIRECTORY ENTRY ?
S3
YES
S3-1
STORE ROOT DIRECTORY AT DIRECTORY TABLE
NO
SKIP TO EACH DIRECTORY
S4
DIRECTORY SEARCH
S5
DIRECTORY ENTRY REGISTRATION
S6
ATTRIBUTES IS SUBDIRECTORY ?
S7
YES
S7-1
PARENT DIRECTORY STORE
SUBDIRECTORY STORE
S7-2
NO
READ ALL DIRECTORY ENTRIES ?
S8
NO
YES
END

FIG. 8


RECORD
SERIAL NO. + 1
S11
PARENT DIRECTORY DESIGNATION
S12
ATTRIBUTES IS FILE ?
S13
NO
YES
FILE DATA INPUT
S14
FILE NAME INPUT
S15
FILE SIZE DETECTION
S16
RECORD SERIAL NO., FILE NAME, ATTRIBUTES, POSITION INFORMATION, FILE SIZE, AND PARENT DIRECTORY
S17
DIRECTORY NAME INPUT
S19
RECORD SERIAL NO., DIRECTORY NAME, ATTRIBUTES, AND PARENT DIRECTORY
S20
NO
RECORDING END ?
S18
YES
RETURN

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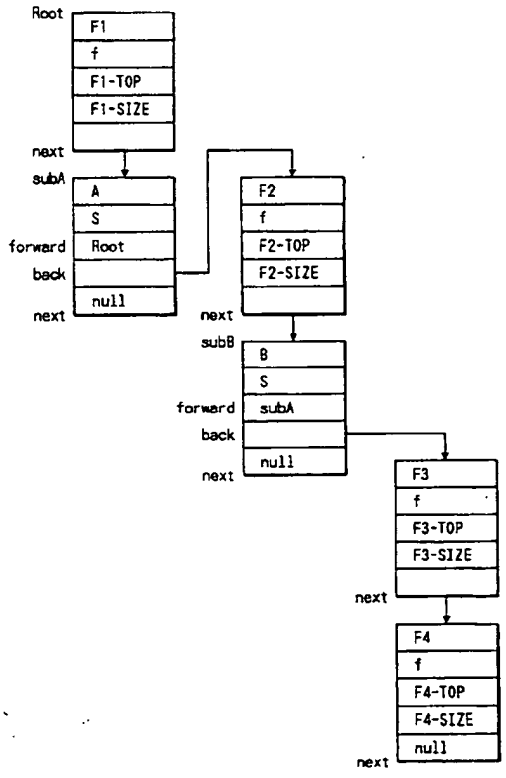
(54) Directory management system.

(57) A directory management apparatus for managing data or a directory using directories, includes a data input unit for inputting data, an attribute information generating unit for generating attribute information indicating a directory to which the data input from the data input unit belongs or a directory to which the directory belongs, and a recording unit for recording the data input from the data input unit, and the attribute information generated by the attribute information generation unit on a recording medium.

FIG. 5



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EUROPEAN SEARCH REPORT

Application Number
EP 91 31 0706

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
D,A	EP-A-0 260 115 (CANON K.K.) 16 March 1988 * the whole document *	1-24	G06F15/40 G06F15/413 G11B20/12 G11B27/28
A	WO-A-8 901 663 (MAXIMUM STORAGE INC.) 23 February 1989 * the whole document *	1-24	
A	US-A-4 682 318 (B.E.BUSBY) 21 July 1987 * the whole document *	1-24	
A	EP-A-0 165 382 (I.B.M. CORPORATION) 27 December 1985 * the whole document *	1-24	
A	PROCEEDINGS OF THE INTERNATIONAL CONFERENCE ON DATA ENGINEERING 1984, SILVER SPRINGS, U.S.A. pages 175 - 180 P. RATHMANN 'Dynamic data structures on optical disks' * the whole document *	1-24	

TECHNICAL FIELDS SEARCHED (Int. Cl.5)

G06F
G11B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	12 NOVEMBER 1992	KATERBAU R.E.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

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(54) Method and apparatus for merging a digitized image with an alphanumeric character string.

(57) A method is disclosed for merging an alphanumeric data stream with a digitized image file. It comprises the steps of inputting a digitized image file in a first input terminal and storing the digitized image file on a first storage medium. The method then inputs an alphanumeric character string in a second input mechanism and stores the alphanumeric character string in a second storage medium. The method then converts the alphanumeric character string stored in the second storage medium into a bit pel image of the alphanumeric character string by substituting a two dimensional bit pattern of pels for each respective character in the string. The method then performs a logical combination of the bit pattern for each respective alphanumeric character with the digitized image at respective intended character locations in the digitized image area and outputs the logically combined digitized image with the alphanumeric character string superimposed thereon.

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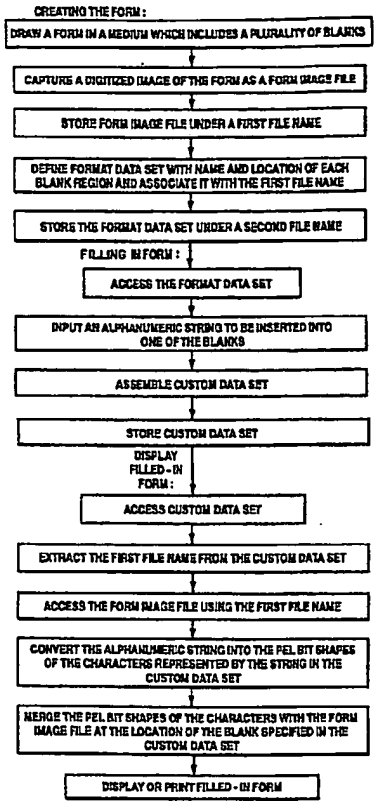
FIG. 3


CREATING THE FORM :
DRAW A FORM IN A MEDIUM WHICH INCLUDES A PLURALITY OF BLANKS
CAPTURE A DIGITIZED IMAGE OF THE FORM AS A FORM IMAGE FILE
STORE FORM IMAGE FILE UNDER A FIRST FILE NAME
DEFINE FORMAT DATA SET WITH NAME AND LOCATION OF EACH BLANK REGION AND ASSOCIATE IT WITH THE FIRST FILE NAME
STORE THE FORMAT DATA SET UNDER A SECOND FILE NAME
FILLING IN FORM :
ACCESS THE FORMAT DATA SET
INPUT AN ALPHANUMERIC STRING TO BE INSERTED INTO ONE OF THE BLANKS
ASSEMBLE CUSTOM DATA SET
STORE CUSTOM DATA SET
DISPLAY FILLED - IN FORM :
ACCESS CUSTOM DATA SET
EXTRACT THE FIRST FILE NAME FROM THE CUSTOM DATA SET
ACCESS THE FORM IMAGE FILE USING THE FIRST FILE NAME
CONVERT THE ALPHANUMERIC STRING INTO THE PEL BIT SHAPES OF THE CHARACTERS REPRESENTED BY THE STRING IN THE CUSTOM DATA SET
MERGE THE PEL BIT SHAPES OF THE CHARACTERS WITH THE FORM IMAGE FILE AT THE LOCATION OF THE BLANK SPECIFIED IN THE CUSTOM DATA SET
DISPLAY OR PRINT FILLED - IN FORM

METHOD AND APPARATUS FOR MERGING A DIGITIZED IMAGE WITH AN ALPHANUMERIC CHARACTER STRING

The invention disclosed broadly relates to data processing methods and apparatus and more particularly relates to the merger of digitized images with alphanumeric character strings in a data processing system.

An example of a system for storing and manipulating digitized images is provided in the copending patent application by C. A. Parks, et al. entitled "Dual Density Digital Image System," serial number 211,646, filed June 27, 1988, assigned to the IBM Corporation and incorporated herein by reference and the copending patent application by C. A. Parks, et al. entitled "Object Management and Delivery System Having Multiple Object Resolution Capability," serial number 211,722, filed June 27, 1988, assigned to the IBM Corporation and incorporated herein by reference. These two patent applications describe an example digital image archiving system within which the invention described herein finds application. In the prior art, if a user of a digital image archiving system wished to enter a form into the system which had been filled out, for example an application for automobile insurance wherein the applicant's name and home address, etc. are filled in on a form, the user would have to print out the applicant's customized data onto a preprinted form and then optically scan that filled-in form using an optical scanner. The resultant digitized image would then be entered into the image archiving system. This approach is not efficient in the use of operator time nor is it efficient in the use of materials such as preprinted forms. The prior art has not found an adequate solution for problems such as this.

It is therefore an object of the invention to provide an improved means for merging alphanumeric information with digitized images.

It is another object of the invention to provide an improved means for entering customized data onto a predefined form for entry in a digitized image archiving system.

It is still a further object of the invention to provide a means to process coded data along with digitized images in a digitized image archiving system.

It is yet a further object of the invention to provide a means for processing coded data along with digitized images so as to automatically merge the two for subsequent storage, display or printing.

These and other objects, features and advantages are accomplished by the invention disclosed herein. A method is disclosed for merging an alphanumeric data stream with a digitized image file comprising the steps of inputting a digitized image file in a first input terminal and storing the digitized image file on a first storage medium; inputting an alphanumeric character string in a second input mechanism and storing the alphanumeric character string in a second storage medium; converting the alphanumeric character string stored in the second storage medium into a bit pel image of the alphanumeric character string by substituting a two dimensional bit pattern of pels for each respective character in the string; performing a logical combination of the bit pattern for each respective alphanumeric character with the digitized image at respective intended character locations in the digitized image area; and outputting the logically combined digitized image with the alphanumeric character string superimposed thereon.

In a data processing system, a process is disclosed for preparing a form, comprising the steps of drawing a form in a medium, which includes a plurality of blank regions; capturing a digitized image of the form as a form image file in the data processing system; storing the form image file under a first file name in the data processing system; inputting name data and location data for each of the blank regions in the form and associating the first file name in a format data set; storing the format data set under a second file name in the data processing system. To fill in a form, the format data set is accessed and an alphanumeric string to be inserted into one of the blanks is input. Then the custom data set is assembled which includes the first file name, and customized data represented by the alphanumeric string. The custom data set is then stored. One of the features of the invention is that the plurality of custom data sets can be stored, each having a small storage area and each corresponding to a single form image file which occupies a much larger portion of storage. To display a filled-in form, the custom data set is accessed and from it the first file name is extracted. Then, the form image file can be accessed using the first file name. The alphanumeric strings in the custom data set are then converted into pel bit shapes of the characters represented by the string. Then, the pel bit shapes of the characters can be merged with the form image file at the location of the blanks specified in the custom data set. Finally, the resulting filled-in form can be displayed or printed.

These and other objects, features and advantages of the invention can be more fully appreciated with reference to the accompanying figures.

Fig. 1 is a functional block diagram of a digitized image archiving system which includes the coded data storage processor invention.

Fig. 2 is a more detailed functional block diagram of a coded data storage processor input and output flow, in accordance with the invention.

Fig. 3 is a flow diagram of the sequence of operational steps, in accordance with the invention.

Fig. 4 depicts the image of a blank application form.

Fig. 5 illustrates the format data set.

Fig. 6 depicts the custom data entry at a terminal.

Fig. 7 illustrates the custom data sets for three data sets.

Fig. 8 illustrates the relative size of the form image file and the custom data sets.

Fig. 9 illustrates character placement and in particular illustrates base line positioning for pel bit images of alphanumeric characters when merged with the form image file.

Fig. 10 illustrates the image of a filled-in application form.

This invention describes a means to process coded data along with image in Image System as described by the patent applications by C. A. Parks, et al. referenced above and the ability to process either in the work-station, with the additional capability of automatically merging the two on the display or printer bit plane if they have been logically related through record header information.

The Coded Data Storage Processor is a software component designed to facilitate the storage of coded data (non-image records) into the IBM Image System MVS/ESA folder structure as discussed in the C. A. Parks, et al. patent applications cited above; thereby allowing coded data as well as images to be securely stored, managed and processed through the, heretofore, image only processing features of that system.

Internal processing features of the Image System MVS/ESA are such that it has the capability of processing either images or coded data throughout the system. The object workstations have the additional capability of merging the coded data with a preidentified image overlay for a composite presentation on the workstation display or the workstation printer. These features allow the storage of coded data in non-image form (EBCDIC - Extended Binary Coded Decimal Interchange Code), thereby greatly reducing the physical storage requirement, while allowing the automatic presentation of the coded data to be in an image-like format.

There is a relational (logical) collection of data that represents all the system information available about a certain entity such as a person or account or policy. This relational collection constitutes a folder of such an entity. Previous art provided either a standalone secure Image (Write Once Read Multiple (WORM) technology) processing capability for a folder of image documents (images and/or coded data stored in image format) or individual or relational processing of various coded data for an entity, but did not provide an integrated processing combination of the two, each stored in its own format, in a single, secure (WORM technology) folder storage and retrieval system. Nor did previous art provide automatic merger capability of the two formats in the workstation. Prior art required direction from the workstation user through menu selection or other interactive means. This integration of image and coded data into the Image System MVS/ESA folder structure is facilitated by and is the essence of our invention.

As further explanation, much previous art has dealt with publishing systems that allow cut and paste or overlay of graphics, images and text (coded data) onto a page or book-like format. Each of these systems must have intimate knowledge of the structure detail of each data piece to accomplish their composition tasks. There is no integrated secure (WORM technology) storage capability for each of the pieces nor is there a concept of an integrated system folder consisting of all data (images, coded data) for an entity that can be stored, retrieved and displayed without user regard to some internal data structure characteristics.

Available system data for collection into a folder are generally not only scanned image data, but also coded data that enter the system through key entry, other non-image input system processing means or through system generation (computation). Coded data are normally stored on magnetic DASD or tape media that are created when the coded data are captured or generated by the computer system. Previous art allowed printouts of such data to be captured as images through a scanning process and to be included as image data in a folder.

Fig. 1 depicts the components of the Image System MVS/ESA (1-6, 8, 14, 15) with the inclusion of this invention (7).

The Folder Application Facility (FAF) (1) maintains the logical relationship of images (15) and coded data (8) to a folder. The Object Distribution Manager (ODM) (2) routes requests for images and coded data processing throughout the Image System MVS/ESA. The Object Access Method (OAM) (3) manages the storage of images and coded data on DASD (5) and Optical Disk (6) using WORM technology. The Object Workstations (4) are used to display or print images and/or coded data.

The Coded Data Storage Processor (7) is a software component written in COBOL II that is executed as a CICS (Customer Information Control System) application program under MVS/ESA. The input/output flow of this component is depicted in Figs. 1 and 2.

1. Reads a processing parameters input file (9) to determine the start or restart coded data storage run-time environment.

2. Reads an external file (8) of storage authorization commands and coded data records that is generated by the Coded Data Intelligent Printer Image Utility (14) to be stored within the IBM Image System MVS/ESA.

3. Calls the Object Access Method (3) to physically store the coded data records (13) on DASD (5) and Optical Disk (6).

4. Writes registration commands to an external file (10) to be used by the FAF (1) to complete the storage registration process.

5. Provides error reporting to an external file (11) to be used by the FAF (1) for error reconciliation in the storage registration process.

6. Provides report information on an external file (12) to be used for management visibility of the coded data storage process.

Features of this invention are:

1. Allows storage of up to 15 million byte record length coded data records without regard to internal data architectural format.

2. Runs in a separate CICS processing region from the Image System MVS/ESA to avoid interference with that system's processing region resources.

3. Processes coded data records represented in a presentation text data architecture format (non-image) but is not restrictive to that architecture.

4. Provides simple restart logic to be used during error recovery processes.

In summary, the Coded Data Storage Processor (7) (CDSP) is a software component that facilitates storage of non-image records (coded data) (13) onto the same storage devices (5,6) used in the Image System MVS/ESA for image storage. Furthermore, the coded data format structure supported is such that the records may be fully utilized within the Image System MVS/ESA as representing documents (records) to be retrieved, displayed and printed, in a like manner to image documents. Furthermore, its support to the FAF component (1) of the IBM Image System MVS/ESA allows the system's coded data records and image records to be logically related in an individual folder entity, with the Image System MVS/ESA providing access to either or both types of records in a single, integrated folder processing transaction request and provides for the merger of coded data and image data at a workstation without operator intervention. Fig. 3 is a flow diagram illustrating the three major stages in accordance with the method of the invention, namely creating the form, filling in the form, and displaying the filled-in form.

In the flow diagram of Fig. 3, the form is created by drawing a form, which includes a plurality of blank regions, in a medium such as on a sheet of paper or on a video screen using a computer assisted design program. An example of such an image of a form is shown in Fig. 4. As can be seen in Fig. 4, the medium, in this example a sheet of paper, is divided into a plurality of columns and a plurality of rows. In Fig. 4, there are shown to be 33 columns and 24 rows. Each alphanumeric character will occupy the rectangle corresponding to the intersection of one row and one column. In the example of Fig. 4, an application form is being created for the ABZ Insurance Company. The form will have three name fields "Customer Name," "Customer Address," and "Policy Number." Corresponding to each of these three name fields there will be a blank region defined by a beginning row and column coordinate and a length, to corresponding with the initial position of the first character of an alphanumeric string and the maximum length of that alphanumeric string which will be inserted at a later time in the blank region. An example of a data set, called a format data set, which specifies the form image file name, the names of the blank fields, the field locations and the field lengths, is shown in Fig. 5, as a format data set.

In accordance with the flow diagram of Fig. 3, after the form of Fig. 4 has been drawn, its digitized image is captured as a form image file in an Image System such as that described in the Parks, et al. patent applications cited above. The form image file is then stored under a first file name, such as "Application," in the Image System bulk storage. As a part of the process of creating the form, the format data set of Fig. 5 is created by specifying the form image file name, "Application," and by specifying the name of each respective blank region in the form. For each blank region specified in the form, the name of the field, the location of the field and its length are also included in the format data set, as is shown in Fig. 5. Then, in accordance with the flow diagram of Fig. 3, the format data set is stored under a second file name in the Image System. Alternately, the format data set can be stored in a separate storage device since the relationship between the format data set of Fig. 5 and its corresponding form image file of Fig. 4 is established by including the form image file name "Application" in the format data set. One could, for example, maintain the format data set on a diskette which is stored outside of the Image System. At this point, the form has been created and has been stored for future use.

Further in accordance with the flow diagram of Fig. 3, at a later time a copy of the form is desired to be filled in with customized data, for example when a customer of the ABZ Insurance Company wishes to make application by telephone and an employee of the insurance company takes steps to fill in the blanks of an application form at a workstation connected to the Image System. In accordance with the flow diagram of Fig. 3, the operator at the workstation first accesses the format data set of Fig. 5, which contains the information shown in Fig. 5. The terminal at the workstation then operates with the information stored in the format data set of Fig. 5 to display the information necessary for custom data entry, as is shown in Fig. 6. Fig. 6 illustrates a terminal at the workstation where the insurance company employee, in this example, enters the name of the customer, the customer's address and the newly issued policy number. The format data set provides the string "Customer Name" which is displayed on the workstation terminal, along with the information from the length field in the format data set indicating that the customer name must not exceed 20 characters. A similar display is made for "Customer Address" and for "Policy Number" as is shown in the custom data entry display in Fig. 6.

After the operator has input the alphanumeric strings which are intended to ultimately be inserted into the blanks of the form shown in Fig. 4, the custom data set corresponding to this customer's application is assembled, as is shown in Fig. 7. Fig. 7 shows a first custom data set which is constructed by extracting from the format data set the form image file name "Application" and by associating with that form image file name, the character strings corresponding to the "Customer Name," the "Customer Address," and the "Policy Number" as specified in the format data set of Fig. 5. Associated with each of these respective custom strings is the initial position for the location of each respective field as it will ultimately be placed in the image of the form shown in Fig. 4. For example, the custom string for the customer name "John Doe" has associated with it the location field (11,6) in the first custom data set of Fig. 7. The entry "(11,6)" represents the column and row position of the first character in the custom string "John Doe" which will be inserted in the blank field of the form in Fig. 4, corresponding to the "Customer Name." Then, the custom data set for the applicant "John Doe" is stored in the Image System.

As can be seen in Fig. 7, there are two additional custom data sets. The second custom data set for "Mary Doe" and a third custom data set for "Tom Alpha" which have also been created by the operator on the custom data entry terminal in Fig. 6. All three of these custom data sets are stored in the Image System, along with the form image file named "Application." A particular advantage for the invention is illustrated in Fig. 8, in that the size of the form image file, after it is compressed, can be typically 50K bytes. If one were to store the filled-in form for each of the insurance applicants "John Doe," "Mary Doe," and "Tom Alpha," this would aggregate to a total of 150K bytes of necessary storage in the Image System. In accordance with the invention, only a single form image file of 50K bytes is stored in the Image System corresponding to the file name "Application." Then, three different custom data sets are stored in the Image System, each requiring approximately 2K bytes of storage, as is illustrated in Fig. 8. In this manner, approximately 56K bytes of storage are required for three different applicants. This is a significant advantage which is brought about by the invention.

At a later time, it may be desired to display or to print a filled-in form for anyone of the applicants represented by the three custom data sets of Fig. 7. This is achieved in accordance with the flow diagram of Fig. 3 by accessing a custom data set corresponding to a particular applicant. For example, consider that the applicant John Doe has telephoned the insurance company and wishes to discuss his account. The employee at the insurance company will access the custom data set for John Doe. Then, the first file name "Application" will be extracted from the first custom data set. Then, the form image file named "Application" will be accessed. As has been described in the Parks, et al. patent applications cited above, the image for the blank form as shown in Fig. 4, will be decompressed and will be loaded into the display buffer at the workstation.

Now, in accordance with the invention, the alphanumeric character strings in the first custom data set for "John Doe" and the address "123 Baker Street" and for the policy number "23198" will be converted into the pel bit shapes of the corresponding characters represented by the string in the custom data set. Reference to Fig. 9 should be made as an illustration of this conversion. The intersection of each row and column in the depiction of the form image shown in Fig. 4 constitutes a rectangular array of bit pels. This area will be called a character position. Each character position will be made up of a rectangular arrangement of pels. For a 12 pitch font, there are eight pels in the horizontal direction and 16 pels in the vertical direction, and this is illustrated in Fig. 9. For a 10 pitch font there are 10 pels in the horizontal direction and 16 pels in the vertical direction. The conversion process from an ASCII representation of a character such as the "A," to its pel bit shape is performed by a character generation process well-known to the art, wherein the pel bit shape for the character is stored in a read only memory and the two dimensional arrangement of the pels is scanned out when that corresponding ASCII character is used to

address the read only memory. When arranged in a two dimensional rectangle such as a 12 pitch eight by 16 rectangle, the shape of the "A" can be depicted. An example of such character generation can be found in the U. S. patent 4,408,200 by D. J. Bradley, "Apparatus and Method for Reading and Writing Text Characters in a Graphics Display," assigned to IBM Corporation and incorporated herein by reference.

The form image file named "Application" is loaded into the display buffer of an all points addressable display so that the image of the blank application form seen in Fig. 4 is represented in an all points addressable mode, for example with an image buffer that can display an 850 by 1100 pel representation. As an example, each of the fixed characters in the image of the blank application form of Fig. 4, for example the name of the insurance company "ABZ" each character will be depicted in an all points addressable mode. For example the "A" at column 8, row 2 will be depicted in a 12 pitch font in an all points addressable character rectangle having eight horizontal pels and 16 vertical pels for the area of the rectangle. The character positions in the blank areas of the image form of Fig. 4 are generally blank, the pels within each respective character position representing white space, not black space. The alphanumeric character string extracted from the first custom data set such as "John Doe" has each of its respective characters converted to a corresponding pel bit shape as described above. For example, the "J" of "John Doe" is rendered into a pel bit shape and that pel bit shape is then logically oRed with the pels in the character position corresponding to column 11, row 6, followed by the logically oRing of the rest of the alphanumeric character string for "John Doe" into the blank corresponding to "Customer Name" in the image of the blank application form of Fig. 4. Similarly, the address field "123 Baker Street" is inserted at (11,11) and the policy number "23198" is inserted at (15,16) for the blanks on the blank application form in Fig. 4. This results in the image of the filled-in application form shown in Fig. 10. This image is displayed on the workstation display and can optionally be printed on an associated printer.

DETAILED DESCRIPTION OF HOW CDSP WORKS IN SYSTEM

The customer writes a utility program to create the coded data in the data format Presentation Text Object Content Architecture (PTOCA). This data format consists of control sequences that allow selection of a font and allow precise placement of text on a display or printer. PTOCA contains provision for a presentation text data descriptor. This is a separate field that would precede the data for each record. Its purpose is to allow specification of such things as units of measure, maximum sizes and the selection of various options. In accordance with the invention, the presentation of text data would require a descriptor. The coded data items are placed on an external medium (tape, for example) in a format of tape control records followed by one or more sets of storage authorization commands and the corresponding coded data. For those coded data utilizing image overlays, an indicator is placed in each coded data header record containing the name of the form.

In a separate process, the customer scans the image overlays and creates an object record for each using the same name used in the coded data header, thus "connecting" the coded data to the overlay image form.

The tape is input to the image in a batch process where the coded data storage processor reads the records on the tapes and issues storage requests to the object storage manager through the API created for object storage. The coded data storage processor creates a return record containing a register command (successful storage indicator) for each successful coded data object that is stored by the object storage manager. When all coded data objects have been stored, the tape is returned to the customer Folder Application Facility (FAF) where a document index for each coded data object is then updated to indicate successful storage. Folder Application Facility (FAF) and Object Distribution Manager (ODM) were described in the Parks, et al. patent applications referenced above. The coded data objects are now available for processing in the customer application system.

When a request is made by the FAF to display a coded data object that uses an image overlay, the image system (ODM) requests a retrieval of both the coded data object and any associated image overlays (it knows this by looking at the coded data header) from the object storage manager. Both the coded data object and the image overlay are sent to the image workstation.

The image workstation software determines that the coded data and the image overlay go together (again by looking at the coded data header) and merges the two on the workstation display plane.

Coded Data Storage Processor Design

Coded Data Storage Component Design - Functionality Overview:

The Coded Data Storage component (CDS) performs the following functions:

1. Reads the CDS processing parameters from an external input file.
2. Reads store commands with Coded Data objects from an external input file.
3. Stores the requested objects in the Object Access Method (OAM).
4. Writes register commands to an external output file for all processed objects.
5. Writes invalid store commands with Coded Data objects to an exception output file.
6. Reports on its processing activities (i.e., control, timing and processing statistics).

CDS performs the above functions using a sequential processing parameters file and an input commands file, an output register file for recording the result of each store request, and an output exception file containing the invalid store commands with the Coded Data. The CDS input/output flow is shown in Fig. 2.

Design Constraints and Assumptions:

The following are the constraints and assumptions made for the design of this component:

Coded Data are received via an external file (i.e., a CICS extra partition transient file). The attributes of the files are: sequential, variable records. Each Coded Data record contains the required store command followed by the Coded Data object. The program does not assume a specific order. The design does not assume an input/output media (i.e., a tape or a disk). However, it is recommended that tapes be used for this component. Coded data are not received from FAF in online transactions. The CDS transaction will supply the extra partition input processing parameters queue name. The format of the CDS processing parameters are described in the section entitled "Extra Component Data Areas." The Coded Data input file contains two types of records: a user control record and a CDS record containing a store command and the Coded Data object. The format of each record is described in the section entitled "Extra Component Data Areas."

The register output file contains two types of records: the user control record from the input file and the Coded Data register command. The formats are described in the section entitled "Extra Component Data Areas." This file is read by FAF at a later time. The output exception file will contain the input Coded Data store command record in error, with the return and reason codes updated, and the command name changed to identify it. This exception file could be analyzed and resubmitted as input to the next CDS run. Note: input control records will not be written to this exception file. CDS supports objects types "C" (coded data) and "D" (overlay data). Coded Data are received via the external input file, and are in EBCDIC format. Coded Data Overlay forms are scanned through the workstations. Coded Data arrive in an IBM defined architectural format compatible with other objects stored in OAM. No envelope or document manipulation is performed. The processing of a Coded Data file is suitable for a batch environment. However, the OAM Interface is only available through CICS. Therefore, this design assumes an implementation of CICS application reading and writing from/to extra partition transient files. Extra partition files are non-recoverable CICS resources and therefore, simple restart logic is included in the PDL. Backup is not required for Coded Data. It is done automatically by OAM. In a distributed environment, it is assumed that each ODM receives only its own Coded Data. This requires that the utility creating the input file assigns the data owning ODM as the proper destination for the file. The application program is designed to process the Coded Data records in sequence. Parallel execution is possible.

Operational Considerations:

The CDS component is designed to run as a CICS application program. It is recommended that a separate CICS region be defined for the processing of Coded Data for the following reasons:

1. If the input or output file is a tape, the possibility for causing waits in the main ODM region is eliminated.
2. A separate CICS region can be started at a selected time as a batch job or a started task without interfering with the rest of the system. This can be done when the external file is available.
3. The DCT entries defining the extra partition files can be coded with the file open initial mode making it immediately available to the application program.

A separate CICS region can be started with minimal operator intervention. This can be accomplished by

defining a batch terminal. The terminal input is read from a JCL DD card. The specified input causes the transaction to start and pass parameters to the program. The region may also be automatically terminated at the end of processing.

Component Interfaces:

The Coded Data Storage Processor (CDS) interfaces with the following components: OAM Interface - CDS with the OAM interface to store objects in OAM managed storage.

Performance Criteria:

The CDS process is streamlined to process single record objects at the maximum speed. Objects that are multiple records, will incur additional overhead.

Memory Space Allocation:

The OAM Component requires a buffer for each object that needs to be stored. The size of the buffer must equal the object size plus additional control information. This buffer description will be part of the CDS input record. One GETMAIN, at the program initialization for 32K, will be done to place the input record. When storing multiple record objects, a 32K buffer will be allocated for each record. All the records needed to build the object will be read into these buffers before the object is stored. Since the object size of Coded Data is very small (relative to the images), memory space is not of major concern for this component.

Module Definitions:

The CDS component runs as an application program in a CICS region. It is composed of one module: Process Coded Data (OMDDSTOR). **OMDDSTOR Process Coded Data:**
START OF SPECIFICATION
MODULE-NAME: OMDDSTOR
DESCRIPTIVE-NAME: Process Coded Data
COPYRIGHT: IBM Corporation
STATUS: Version 1 Release 1
FUNCTION: Stores Coded Data received from an external input file.
OPERATION:

1. Receive the input parameter queue name.
2. Read control parameter.
3. Read a Coded Data Item from the external input file.
4. Request the OAM Interface to store the object.
5. Write a register confirmation to an external output file.
6. Produce a control report with processing statistics. **RECOVERY OPERATION:**

This program uses extra partition files which are not recoverable CICS resources. The program indicates within the register command when a CICS SYNCPOINT was issued. When the program starts, a check is made for a restart parameter, and an object name to restart after, from the input control record. Records prior to that object name are read but not processed. When a match on object name is made, normal processing resumes on the next record.
DEPENDENCIES: Availability of Coded Data file.
MODULE TYPE: Program.
PROCESSOR: COBOL II
ATTRIBUTES: AMODE(31) RMODE(ANY)DATA(31).
RETURN CODES: None.
EXIT-NORMAL: Returns to CICS.
EXIT-ERROR:
Clean up resources (buffers, rollback to a previous syncpoint) and terminate processing.
FILES/QUEUES-USED:

1. Input Processing Parameters file (extra partition) -INPUT.
2. Input Transaction file (extra partition) -INPUT.
3. Register output file (extra partition) -OUTPUT.
4. CDS Exception file (extra partition) -OUTPUT.
5. CDS Control Report (extra partition) -OUTPUT. **MESSAGES**: TBD.

ABEND-CODES: None.
CHANGE ACTIVITY: Initial release.
END OF SPECIFICATION

Extra Component Data Areas - Coded Data Input File Formats:

The Coded Data input file contains two types of records:

1. Control Record	
Field Name	Description
record-type	An indicator of a control record type ("CNTL").
control-data	User defined control record data.
Note: Control record data is user defined. The Control Record(s) is written to the Register Record file. The first 80 bytes of the Control Record(s) is written to the Control Report.	

2. Coded Data Store Record	
Field Name	Description
command-code	An indicator of a store record type ("STRC"). Store record from exception file ("STRE").
ssysid	(not used).
tsysid	(not used).
osysid	(not used).
segment-number	Object segment number.
number-of-segments	Total number of segments for the object.
object-size	Total object size (in bytes).
numpages	Total pages in object.
copy-code	Copy code = Y, stores a copy.
tempid	Temporary ID (TEMPID).
object-name	CDS object name.
object-type	Object type code.
storage-class	OSM storage class (optional).
management-class	OSM management class (optional).
retention-period	OSM retention period (optional).
return-code	Return Code - STRE command only.
reason-code	Reason Code - STRE command only. OSM's buffer segment description.
segment-length	Segment length (object data + 8 in bytes).
used-length	Object-Data size (length of object-data in bytes).
object-data	Coded Data object data.

Register Output File Formats:

The Register output file contains two types of records:

1. Control Record	
Field Name	Description
record-type	An indicator of a control record type ("CNTL").
record-data	The identical record read from the Coded Data input file.

2. Register Record	
Field Name	Description
record-type	An indicator of a control record type ("REGC").
ssysid	(not used).
tsysid	(not used).
osysid	(not used).
numpages	Total pages in object.
object-name	CDS object name.
object-type	Object type code.
tempid	TEMPID.
return-code	Return Code.
reason-code	Reason Code.
copy-code	Copy code = Y, stores a copy.
syncpoint-flag	Y = syncpoint occurred after this record.

CDS Transaction Parameters File Format:

The CDS Transaction Parameters are contained in an 80 byte sequential, on keyword per record, file.

1. Comment Record: (not required)				
Field Name	Value	Col	Req	Description
KEYWORD	'*'	1	Y	Comment. an asterisk in column 1 can be used to denote a comment line.
Filler		2-80	n	Comment

2. Syncpoint Interval Record: (required)				
Field Name	Value	Col	Req	Description
KEYWORD	'SYNCINTR='	1-9	Y	Syncpoint Interval Keyword
SYNCINTR	1 - 9999	10-14	Y	The number of records to be processed before a syncpoint is taken.
Filler		14-80	n	Comment

3. Error Threshold Record: (required)				
Field Name	Value	Col	Req	Description
KEYWORD	'ERRTHRES = '	1-9	Y	Error Threshold Keyword
ERRTHRES	1 - 9999	10-14	Y	The no. of non-system record errors before processing should terminate.
Filler		14-80		Comment

4. CDS Input Queue Record: (required)				
Field Name	Value	Col	Req	Description
KEYWORD	'INCDATAQ='	1-9	Y	CDS Input Queue Keyword
INCDATAQ	(queue name)	10-17	Y	Input extra partition queue name.
Filler		18-80	n	Comment

5. CDS Register Queue Record:				
Field Name	Value	Col	Req	Description
KEYWORD	'OUTREGIQ='	1-9	Y	CDS Register Queue Keyword
OUTREGIQ	(queue name)	10-17	Y	Output Register extra partition queue name.
Filler		18-80	n	Comment

6. CDS Exception Queue Record: (required)				
Field Name	Value	Col	Req	Description
KEYWORD	'OUTEXCPQ='	1-9	Y	CDS Exception Queue Keyword
OUTEXCPQ	(queue name)	10-17	Y	Output Exception extra partition queue name.
Filler		18-80	n	Comment

7. CDS Report Queue Record: (required)				
Field Name	Value	Col	Req	Description
KEYWORD	'OUTRPRTQ='	1-9	Y	CDS Report Queue Keyword
OUTRPRTQ	(queue name)	10-17	Y	Output Report extra partition queue name.
Filler		18-80	n	Comment

8. Restart Flag Record: (not required)				
Field Name	Value	Col	Req	Description
KEYWORD	'RSTRTFLG='	1-9	Y	Restart Flag Keyword
RSTRTFLG	'Y', 'N'	10	n	Y = CDS processing is being restarted. Note: Default is N.
Filler		11-80	n	Comment

9. Restart Object Name Record: (not required see note *)				
Field Name	Value	Col	Req	Description
KEYWORD	'ROBJNAME='	1-9	Y	Restart Object Name Keyword
ROBJNAME	(object name)	10-49	*	Name of object to restart after.
Filler		18-80	n	Comment

*Note: A Restart Object Name Record is required, with ROBJNAME coded if Restart Flag Record is coded with RSTRTFLG=Y.

Control Report Output Report Format:

```
                    CDS PROCESSING CONTROL REPORT

    RUN DATE - 99-99-99
    RUN TIME - 99:99:99

    SECTION 1:  PROCESSING PARAMETERS
```

```
SYNCPOINT INTERVAL  = 9999
ERROR THRESHOLD     = 9999
CDS INPUT QUEUE     = XXXXXXXX
CDS OUTPUT QUEUE    = XXXXXXXX
CDS EXCEPTION QUEUE = XXXXXXXX
CDS REPORT QUEUE    = XXXXXXXX

RESTART FLAG        = X
RESTART OBJECT NAME = XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

SECTION 2:  ERROR REPORT

CONTROL RECORD:
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
ERROR: XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
       XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
ERROR: XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

SECTION 3:  CDS PROCESSING STATISTICS

CDS PROCESSING COMPLETE - RETURN CODE 9999   REASON CODE 9999

INPUT     RECORDS READ          - 9,999,999
          CONTROL RECORDS READ                - 9,999,999
          CODED DATA STORE STRC RECORDS READ - 9,999,999
          CODED DATA STORE STRE RECORDS READ - 9,999,999

OBJECTS SUCCESSFULLY STORED   - 9,999,999

OBJECTS WRITTEN TO EXCEPTION  - 9,999,999
          DUPLICATE OBJECT ERRORS             - 9,999,999
          COMMAND VALIDATION ERRORS           - 9,999,999
```

```
OUTPUT RECORDS WRITTEN          - 9,999,999
        CONTROL RECORDS WRITTEN              - 9,999,999
        REGISTER RECORDS WRITTEN             - 9,999,999
TOTAL NUMBER OF BYTES STORED    - 999,999,999K

TOTAL NUMBER OF PAGES           - 999,999,999,999

TOTAL ELAPSED TIME OSM          - hh:mm:ss

TOTAL ELAPSED TIME CDS          - hh:mm:ss
```

The resulting method and apparatus to merge a digitized image with an alphanumeric character string provides a more efficient and automatic way of merging these two diverse types of information, than has been available in the prior art.

Although a specific embodiment of the invention has been disclosed, it will be understood by those having skill in the art that minor changes can be made to the specific embodiment without departing from the spirit and the scope of the invention.

Claims

1. A method for merging an alphanumeric data stream with a digitized image file comprising the steps of:
inputting a digitized image file in a first input terminal and storing the digitized image file on a first storage medium;
inputting an alphanumeric character string in a second input mechanism and storing the alphanumeric character string in a second storage medium;
converting the alphanumeric character string stored in the second storage medium into a bit pel image of the alphanumeric character string by substituting a two dimensional bit pattern of pels for each respective character in said string;
performing a logical combination of said bit pattern for each respective alphanumeric character with said digitized image at respective intended character locations in said digitized image area;
outputting said logically combined digitized image with said alphanumeric character string super-imposed thereon.

2. The method of claim 1 which further comprises:
said outputting step including displaying said superimposed image on a display device and/or printing said superimposed image on a printer.

3. The method of claim 1 or 2 wherein said logical combining step includes an ANDing and/or ORing and/or an EXCLUSIVE-ORing.

4. In a system for storing a digitized image file, an apparatus for combining an alphanumeric character string and superimposing said alphanumeric character string onto said digitized image file, comprising:
a first input device for inputting said digitized image;
a first storage device for storing said digitized image as a data file;
a second input means for inputting an alphanumeric character string;
a second storage mechanism for storing said alphanumeric character string;
a conversion means for converting each respective alphanumeric character in said alphanumeric character string into a corresponding pattern of pel bits creating a two dimensional image of said respective alphanumeric characters;
a logical combining means for logically combining said pel bit pattern of each respective alphanumeric character with said digitized image file forming a superimposed image of said image file and said alphanumeric characters;
an output means for outputting said superimposed image.

5. The apparatus of claim 4 which further comprises:

a display means for displaying said superimposed image and/or a printer means for printing said superimposed image.

6. The apparatus of claim 4 or 5 which further comprises:
a communications link connected to said output of said system for communicating said superimposed image.

7. A system for communicating an alphanumeric character string from an alphanumeric workstation for display on a graphics workstation connected over a communications link to said alphanumeric workstation, said graphics workstation having an all points addressable display, comprising:
an input means at said alphanumeric workstation for inputting an alphanumeric character string;
a communications link connecting said alphanumeric workstation to a conversion means;
said conversion means converting each respective character in said alphanumeric character string into a corresponding pel bit pattern each said pel bit pattern representing a two dimensional image of its corresponding alphanumeric character;
a second communications link connecting said conversion means to a graphics terminal, for communicating said pel bit patterns representing said alphanumeric characters to said graphics workstation;
display means at said graphics workstation including an all points addressable display, for displaying the pel bit pattern of each respective alphanumeric character received over said second communications link.

8. In a data processing system, a process for preparing a form, comprising the steps of:
drawing a form in a medium, which includes a plurality of blank regions;
capturing a digitized image of said form as a form image file in said data processing system;
storing said form image file under a first file name in said data processing system;
inputting name data and location data for each of said blank regions in said form and associating said first file name in a format data set;
storing said format data set under a second file name in said data processing system;
accessing said format data set;
inputting an alphanumeric character string intended to be inserted into one of said plurality of blank regions;
assemble and store a custom data set which includes said first file name, said alphanumeric character string and said location data;
accessing said custom data set;
extracting said first file name from said custom data set;
accessing said form image file using said first file name;
converting said alphanumeric string into pel bit shapes of characters represented by said string;
merging said pel bit shapes with said form image file at a location specified by said location data in said custom data set.

9. The process of claim 8 which further comprises the step of:
inputting said alphanumeric character string from a bulk storage means and/or inputting said alphanumeric character string from a keyboard device and/or inputting said alphanumeric character string from a communications link connected to said data processing system.

10. The process of claim 8 or 9 which further comprises the step of:
outputting said merged pel bit shapes with said form image file as a merged file.

11. The process of claim 10 which further comprises the step of:
outputting said merged file to an all points addressable graphical display device and/or outputting said merged file to a printer device and/or outputting said merged file to a storage device.

FIG. 1

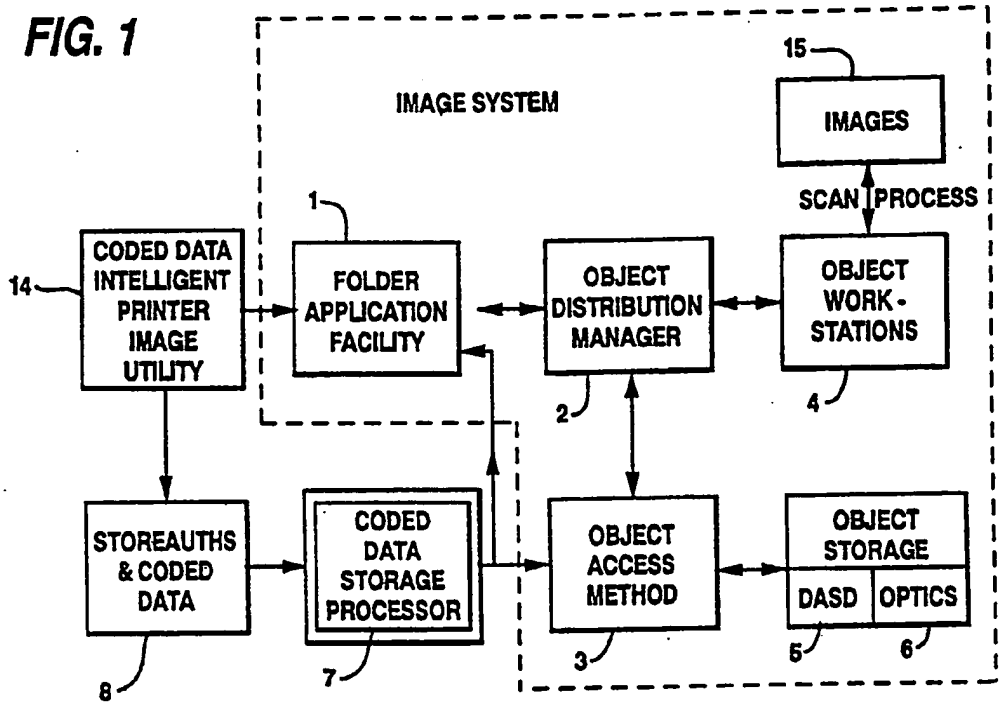


FIG. 2

CODED DATA STORAGE PROCESSOR INPUT / OUTPUT FLOW

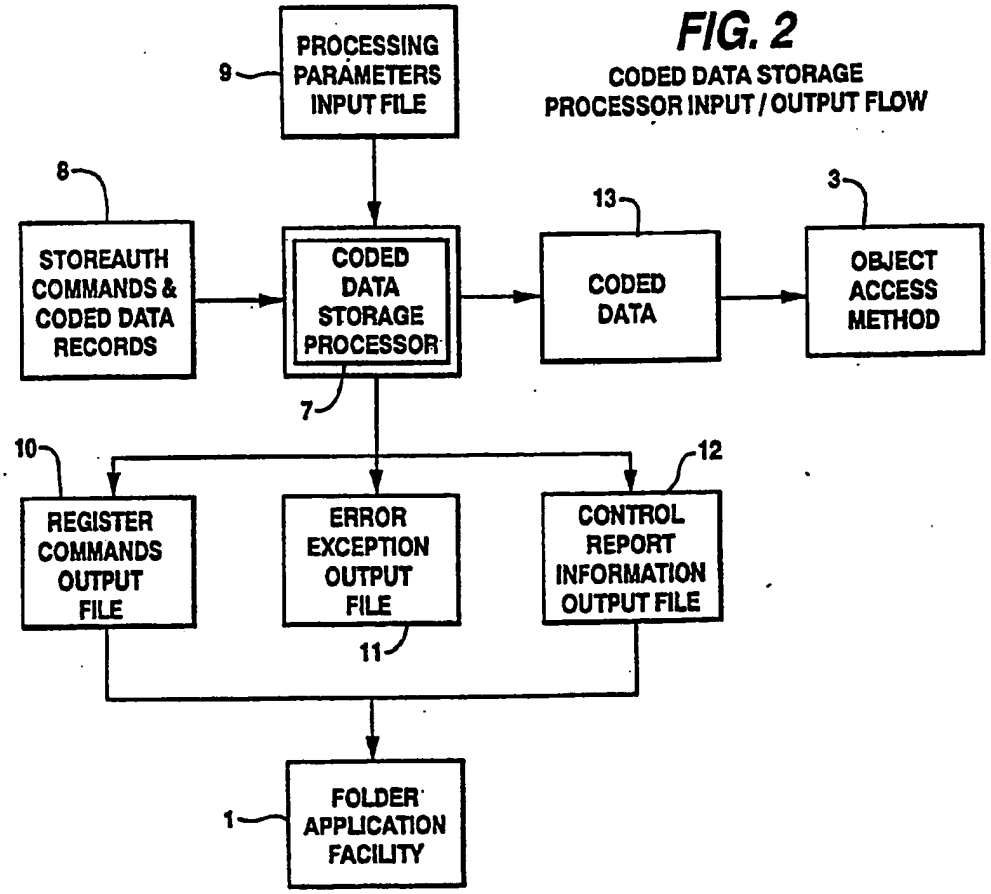


FIG. 3

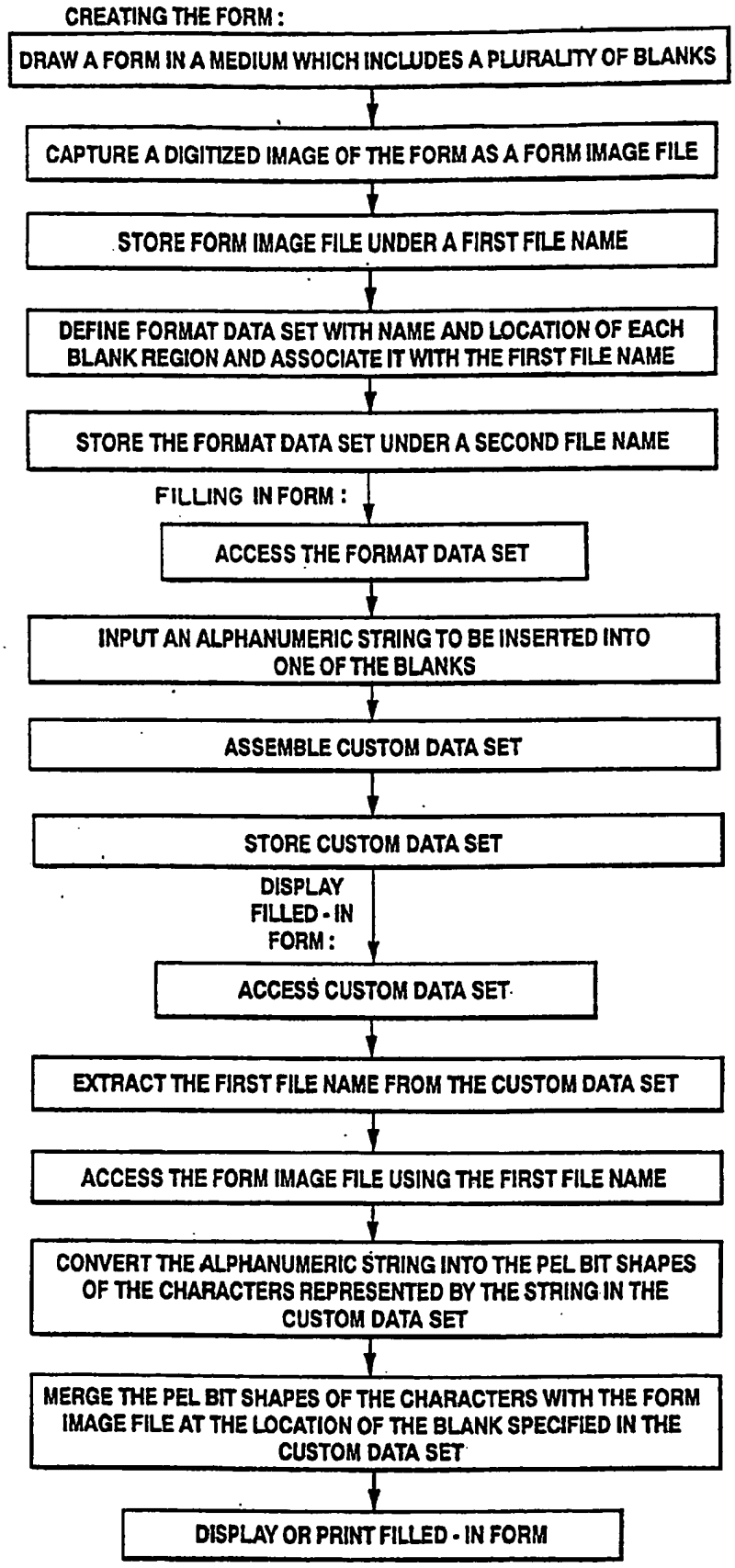
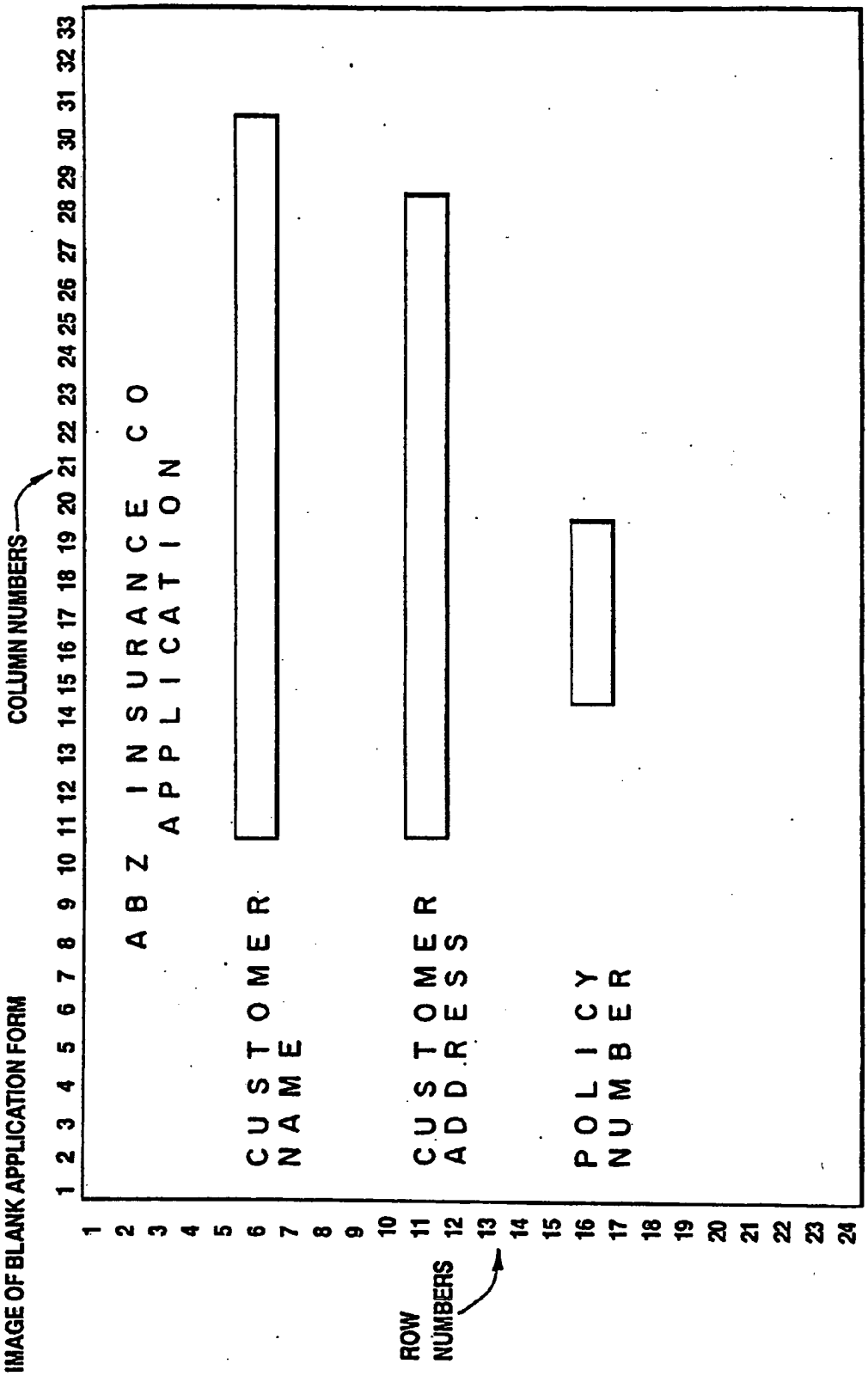

CREATING THE FORM :
DRAW A FORM IN A MEDIUM WHICH INCLUDES A PLURALITY OF BLANKS
CAPTURE A DIGITIZED IMAGE OF THE FORM AS A FORM IMAGE FILE
STORE FORM IMAGE FILE UNDER A FIRST FILE NAME
DEFINE FORMAT DATA SET WITH NAME AND LOCATION OF EACH BLANK REGION AND ASSOCIATE IT WITH THE FIRST FILE NAME
STORE THE FORMAT DATA SET UNDER A SECOND FILE NAME
FILLING IN FORM :
ACCESS THE FORMAT DATA SET
INPUT AN ALPHANUMERIC STRING TO BE INSERTED INTO ONE OF THE BLANKS
ASSEMBLE CUSTOM DATA SET
STORE CUSTOM DATA SET
DISPLAY FILLED - IN FORM :
ACCESS CUSTOM DATA SET
EXTRACT THE FIRST FILE NAME FROM THE CUSTOM DATA SET
ACCESS THE FORM IMAGE FILE USING THE FIRST FILE NAME
CONVERT THE ALPHANUMERIC STRING INTO THE PEL BIT SHAPES OF THE CHARACTERS REPRESENTED BY THE STRING IN THE CUSTOM DATA SET
MERGE THE PEL BIT SHAPES OF THE CHARACTERS WITH THE FORM IMAGE FILE AT THE LOCATION OF THE BLANK SPECIFIED IN THE CUSTOM DATA SET
DISPLAY OR PRINT FILLED - IN FORM

FIG. 4

IMAGE OF BLANK APPLICATION FORM



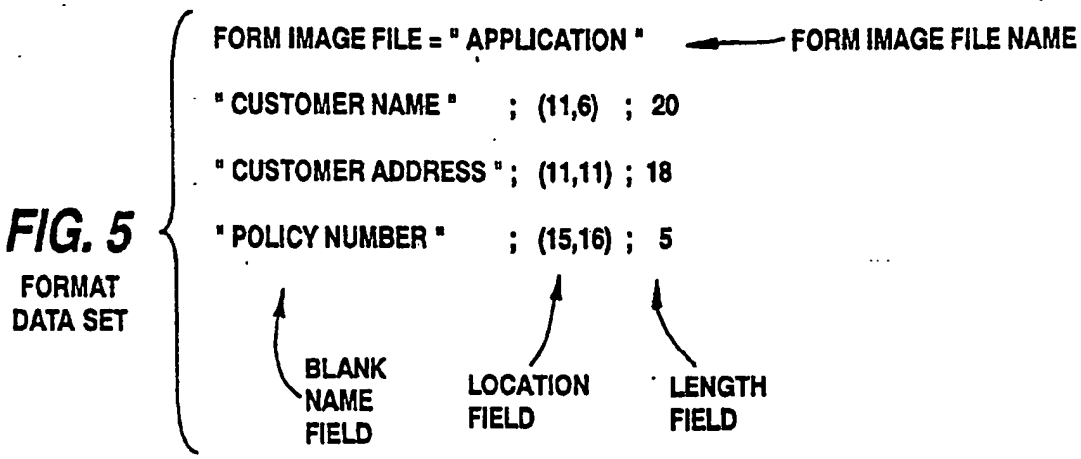


FIG. 5

FORMAT DATA SET

FIG. 6

CUSTOM DATA ENTRY AT TERMINAL

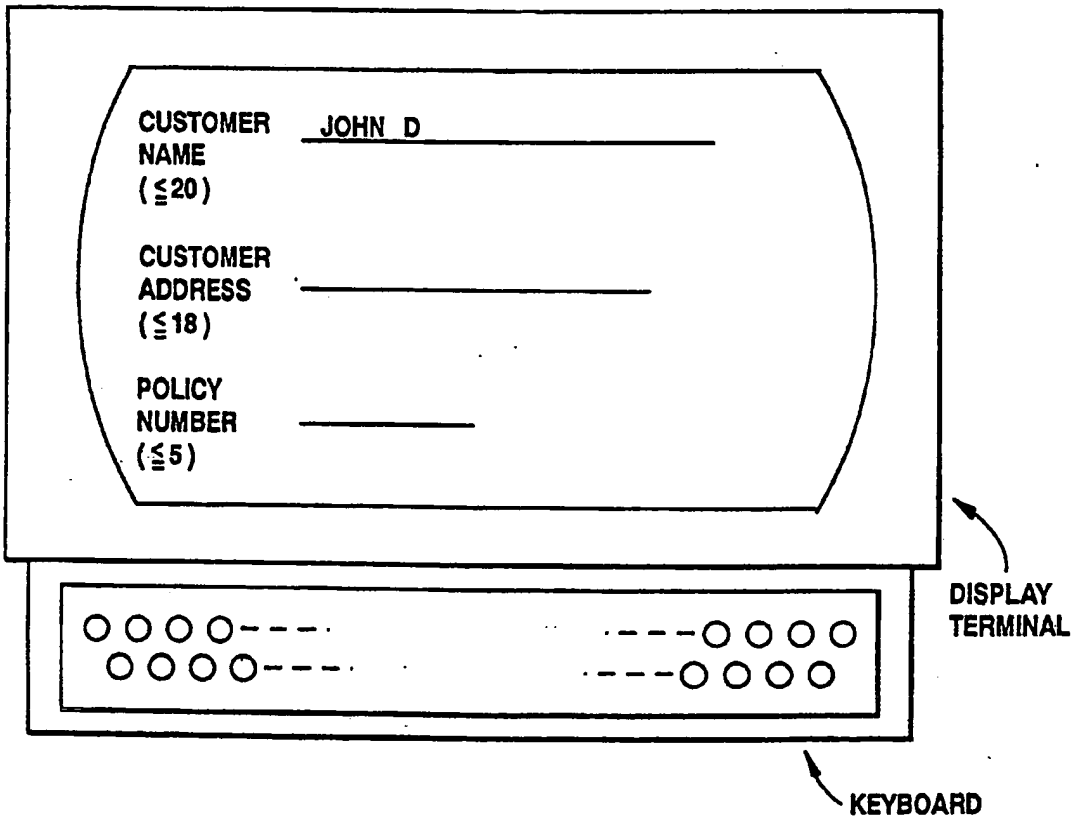


FIG. 7

CUSTOM DATA SETS

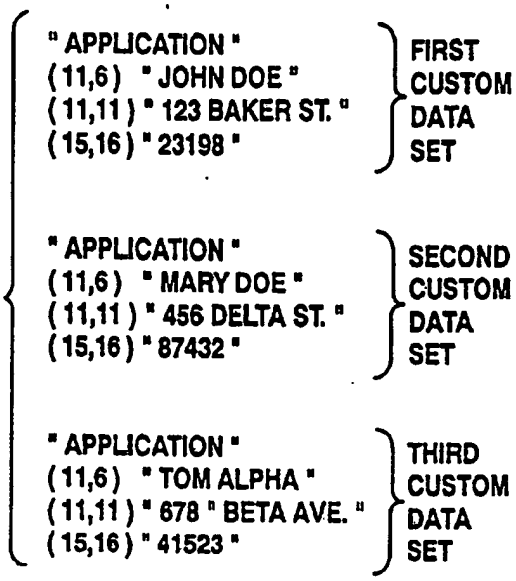
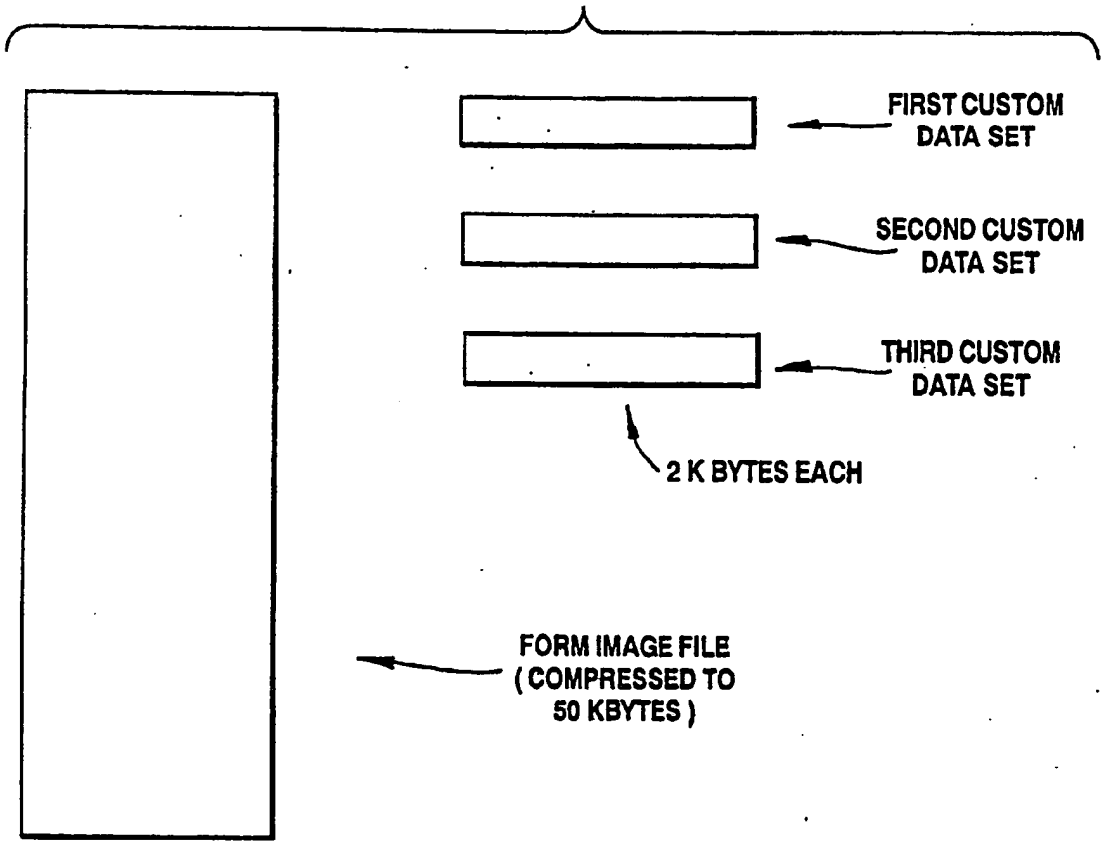


FIG. 8

SIZE OF FILES



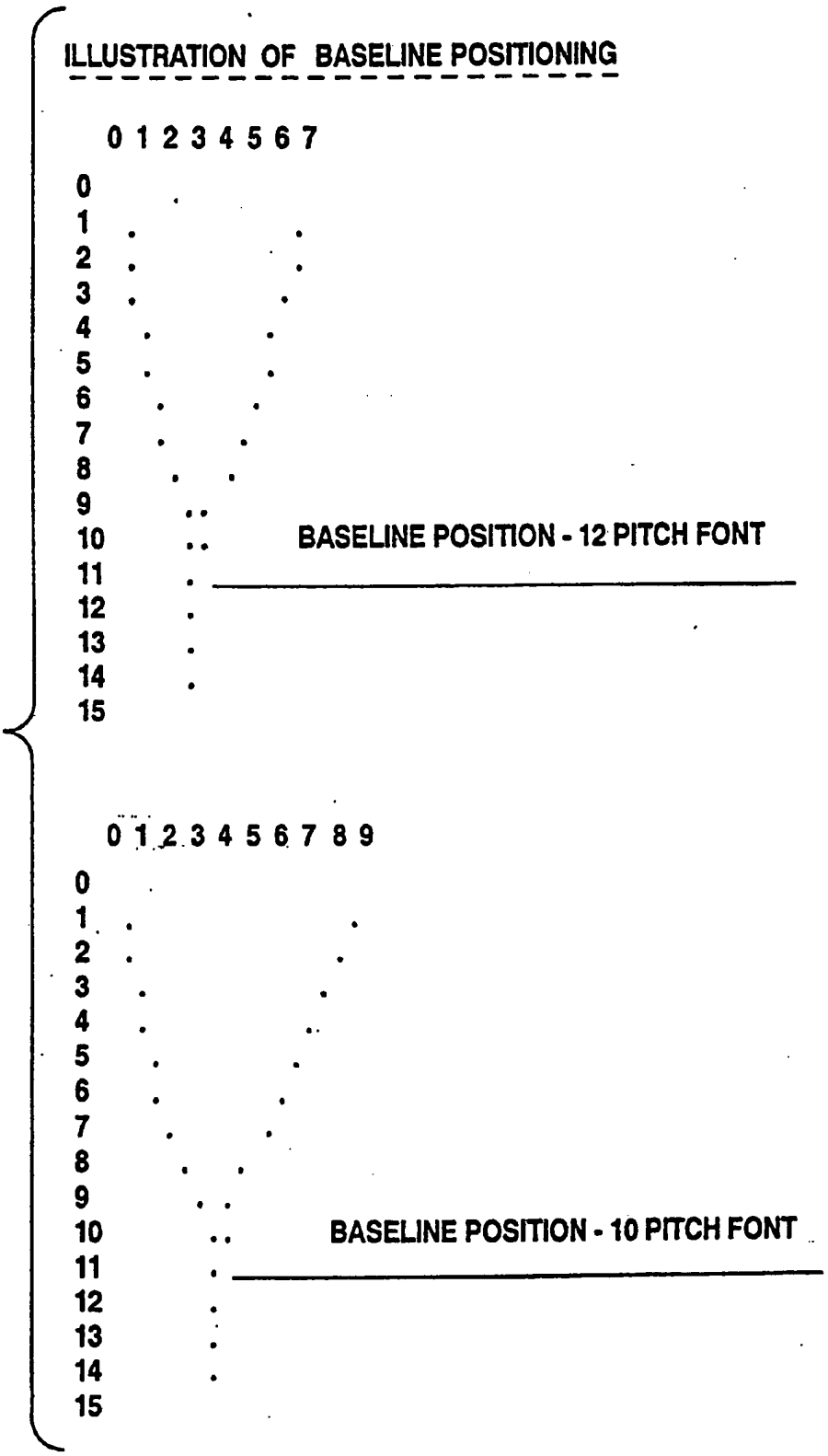
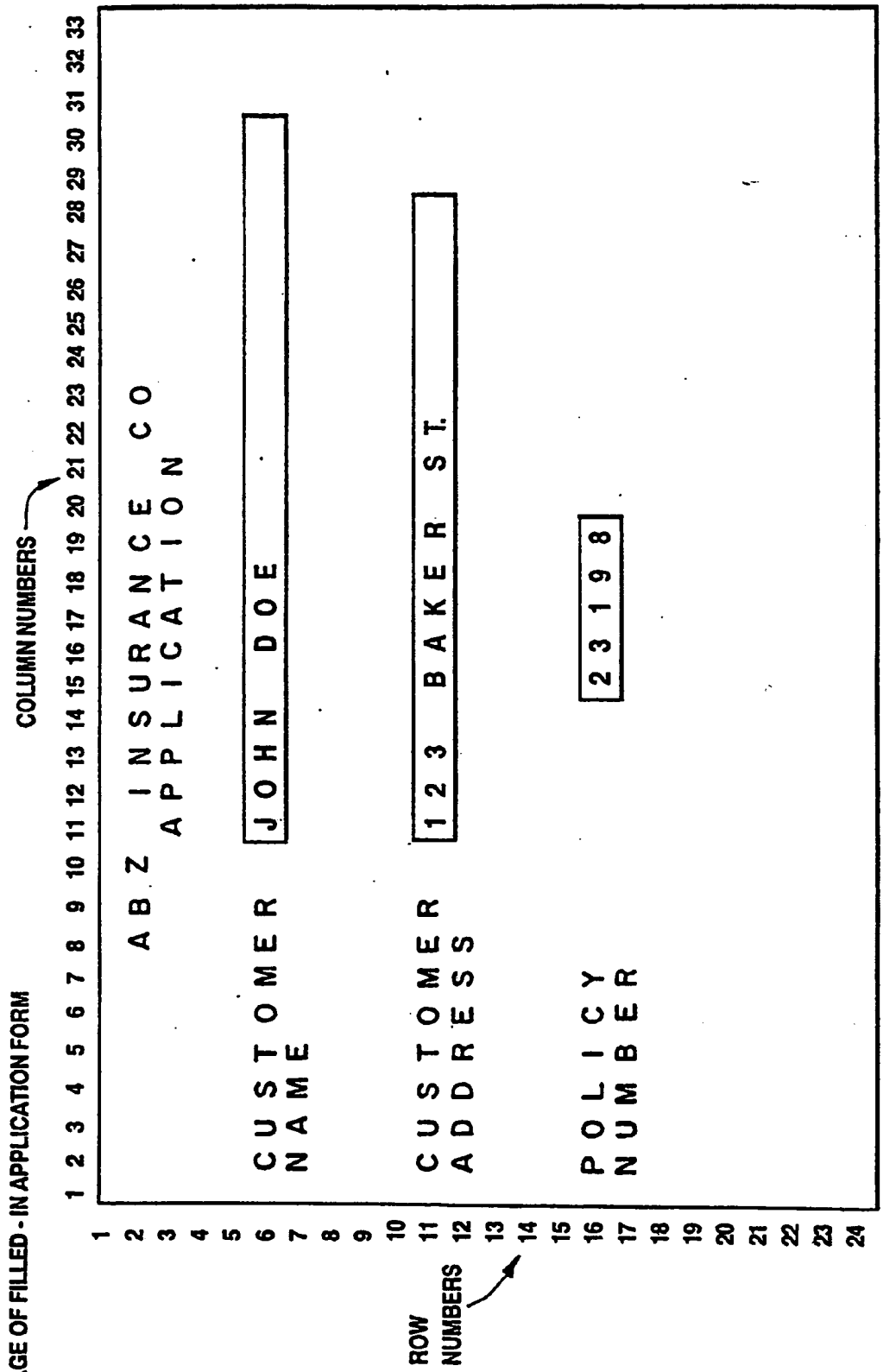


FIG. 9
CHARACTER PLACEMENT

FIG. 10

IMAGE OF FILLED - IN APPLICATION FORM



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(54) **Method and apparatus for merging a digitized image with an alphanumeric character string.**

(57) A method is disclosed for merging an alphanumeric data stream with a digitized image file. It comprises the steps of inputting a digitized image file in a first input terminal and storing the digitized image file on a first storage medium. The method then inputs an alphanumeric character string in a second input mechanism and stores the alphanumeric character string in a second storage medium. The method then converts the alphanumeric character string stored in the second storage medium into a bit pel image of the alphanumeric character string by substituting a two dimensional bit pattern of pels for each respective character in the string. The method then performs a logical combination of the bit pattern for each respective alphanumeric character with the digitized image at respective intended character locations in the digitized image area and outputs the logically combined digitized image with the alphanumeric character string superimposed thereon.

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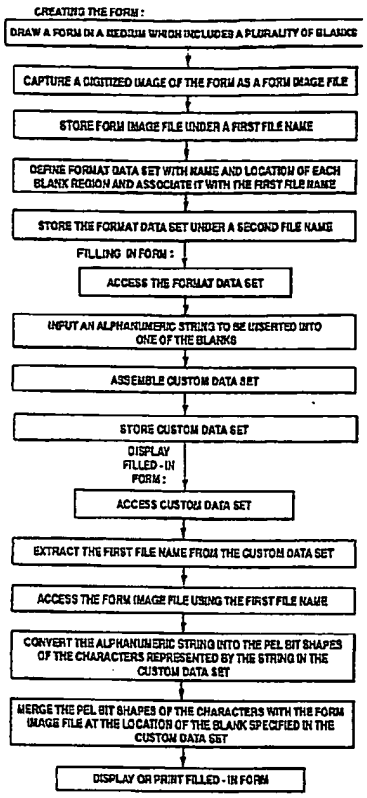
FIG. 3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CAPTURE A DIGITIZED IMAGE OF THE FORM AS A FORM IMAGE FILE
STORE FORM IMAGE FILE UNDER A FIRST FILE NAME
DEFINE FORMAT DATA SET WITH NAME AND LOCATION OF EACH BLANK REGION AND ASSOCIATE IT WITH THE FIRST FILE NAME
STORE THE FORMAT DATA SET UNDER A SECOND FILE NAME
FILLING IN FORM :
ACCESS THE FORMAT DATA SET
INPUT AN ALPHANUMERIC STRING TO BE INSERTED INTO ONE OF THE BLANKS
ASSEMBLE CUSTOM DATA SET
STORE CUSTOM DATA SET
DISPLAY FILLED - IN FORM :
ACCESS CUSTOM DATA SET
EXTRACT THE FIRST FILE NAME FROM THE CUSTOM DATA SET
ACCESS THE FORM IMAGE FILE USING THE FIRST FILE NAME
CONVERT THE ALPHANUMERIC STRING INTO THE PEL BIT SHAPES OF THE CHARACTERS REPRESENTED BY THE STRING IN THE CUSTOM DATA SET
MERGE THE PEL BIT SHAPES OF THE CHARACTERS WITH THE FORM IMAGE FILE AT THE LOCATION OF THE BLANK SPECIFIED IN THE CUSTOM DATA SET
DISPLAY OR PRINT FILLED - IN FORM

European Patent Office

EUROPEAN SEARCH REPORT

Application Number

EP 90 10 0182

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
X	EP-A-0 146 714 (INTERNATIONAL BUSINESS MACHINES CORPORATION) * page 5, lines 12-28; page 7, lines 7-25; claims 1-5; figure 1 *	1-11	G 06 F 15/20 G 06 F 15/72
X	GB-A-2 198 566 (XEROX CORPORATION) * whole document *	1-5	
A	EP-A-0 127 745 (INTERNATIONAL BUSINESS MACHINES CORPORATION) * claim 1 *	1	
A	IBM TECHNICAL DISCLOSURE BULLETIN vol. 26, no. 10A, March 1984, page 5164, Armank, New York, US; Y. T. CHAN et al.: "Creation of forms in word processing display systems" * whole document *		

TECHNICAL FIELDS SEARCHED (Int. Cl.5)

G 06 F

The present search report has been drawn up for all claims

Place of search	Date of completion of search	Examiner
Berlin	12 August 91	ABRAM R

CATEGORY OF CITED DOCUMENTS

X: particularly relevant if taken alone
Y: particularly relevant if combined with another document of the same category
A: technological background
O: non-written disclosure
P: intermediate document
T: theory or principle underlying the invention

E: earlier patent document, but published on, or after the filing date
D: document cited in the application
L: document cited for other reasons

&: member of the same patent family, corresponding document